

School of Public Health

Sexology Department

**Sexual function of women during the first year after childbirth:
Effect of parity (giving birth after the 20th week of pregnancy),
depression and relationship satisfaction**

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**This thesis is presented for the Degree of
Doctor of Philosophy
of
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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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Date:

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Who always had belief in my abilities and supported my dreams.

Abstract

The aim of the present study was to measure the effect of parity, relationship satisfaction and depression on the sexual function of postpartum women during the first year after childbirth. This was a cross-sectional online study, guided by a survey methodology. Postpartum women who had given birth 0-12 months ago were invited to participate in this anonymous study. A multi-section questionnaire requesting information concerning demographics, obstetrics and gynaecological history, baby's characteristics, medical history and sexual life was designed. In order to measure sexual function of postpartum women, the Female Sexual Function Index (FSFI) was used. Symptoms of depression were assessed by the use of the Patient Health Questionnaire (PHQ-8) and the Relationship Assessment Scale (RAS) was employed to investigate the level of relationship satisfaction. Also, women were asked seven open-ended questions about sexual function, mental health and relationships of women during pregnancy and after childbirth. The questionnaire was available online for a period of four months, from May to August 2012. Responses from 325 women who met the inclusion criteria were considered for analysis. The data were analysed using Chi-square test, independent samples *t* test and multiple logistic regression analysis. P-value less than 0.05 was considered as statistically significant. The qualitative data were analysed using content analysis.

This study collected quantitative and qualitative data. Results of the quantitative section of the study showed that 64.3% of the postpartum women studied experienced sexual dysfunction. The most prevalent forms of sexual dysfunction were reported to be sexual desire disorder (81.2%), sexual dissatisfaction (70.5%), orgasmic dysfunction (53.5%), arousal disorder (52.3%), lubrication disorder (43.4%) and pain disorder (39.4%). When analysed as a group, less than one-third of participants in the study (24%) reported symptoms of depression and more than one-third of participants in the study (37.2%) reported dissatisfaction with their relationships. Postpartum sexual dysfunction was shown to be significantly ($p < 0.05$) associated with the following: less frequent sexual activity (fortnightly or less), not being the initiator of sex during a sexual activity with the partner, late resumption of

sexual activity (9⁺ weeks postpartum), 0-5 months postpartum, primiparity, depression and relationship dissatisfaction.

Less than one-fourth of primiparous and less than one-third of multiparous women reported having postnatal depression (18.4% and 26.1%, respectively) ($p=0.187$). Postpartum depression was shown to have a statistically significant association with the following variables: diploma or lower educational level, sexual dysfunction and relationship dissatisfaction ($p<0.05$).

Primiparous (66.7%) and multiparous (61.3%) participants in heterosexual relationships reported high levels of relationship satisfaction ($p=0.437$). The following variables were shown to be statistically significant risk factors for relationship dissatisfaction after childbirth: annual income less than \$50,000, sexual dysfunction, being clinically diagnosed with depression and having symptoms of depression on the PHQ-8 ($p<0.05$). In contrast, women who were in a same-sex relationship were less likely to report relationship dissatisfaction and at 6-12 months postpartum these women reported a higher level of relationship satisfaction compared to 0-5 months postpartum ($p<0.05$).

According to the findings of the qualitative questions in the study, the following factors were reported to make women happy in their sexual relationships: emotion (emotional closeness, intimacy, exclusivity); love (affection and love, feeling desired in a loving and open relationship, sharing friendship, humour, feeling uninhibited, compatibility, caring about each other's needs); meeting sexual needs (foreplay, having an orgasm, mutual sexual enjoyment and high libido of the partner); and physical attractiveness. In addition, women reported that the following factors resulted in unhappiness within sexual relationships: unmet sexual needs (feeling pressure to have sex when not being in the mood; lack of sexual drive, lack of time, lack of emotion); birth related issues (breastfeeding, fluctuation of hormones); physical and physiological issues (tiredness, low self-confidence due to weight gain, sharing bed or room with baby); and conflicts with partners.

Some women reported that pregnancy and childbirth had positive impacts on their sexual function and they had a better sexual life during pregnancy and after childbirth. However, other women reported that pregnancy and childbirth had negative effects on their sexual life for the following reasons: sexual problems (lack of desire for sex or intimacy, lack of lubrication, inability to orgasm, painful intercourse due to vaginal trauma); physical issues (painful caesarean scar, tiredness, sleep deprivation); and intrapersonal issues (role conflict, relationship issues).

Some women reported that pregnancy and childbirth improved their mental health status. However, others declared that pregnancy and childbirth made them very emotional, depressed, anxious, overwhelmed, stressed and less able to cope due to the following reasons: psychological issues (depression, anxiety, insomnia, low self-confidence); delivery-related issues (birth trauma, breastfeeding, poor support from the caregivers and birth attendants); intrapersonal issues (role conflict, lack of support from partners); malnutrition; and fatigue.

Women's sexual function, mental health and relationships can be significantly disturbed during pregnancy and one year after childbirth. Findings confirmed the importance of assessing these aspects of life of women during pregnancy and after childbirth in order to promote the quality of life of women, their families and society.

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Abbreviations

NVD	Normal vaginal delivery
CS	Caesarean section
FSFI	Female sexual function index
PHQ-8	Patient health questionnaire
RAS	Relationship assessment scale

Chapter 1: Introduction

1.1 Background

Preliminary studies on women's health after childbirth have commonly investigated the health and well-being of the infant with less emphasis on the sexual health of postpartum women and their sexual needs after delivery (Baksu, Davas, Agar, Akyol & Varolan, 2007; Chivers, Pittini, Grigoriadis, Villegas & Ross, 2011; De Judicibus & McCabe, 2002; Glazener, 1997; Morof, Barrett, Peacock, Victor & Manyonda, 2003). These studies predominantly focused on the influence of physical factors on the resumption of sexual activity and the frequency of sexual intercourse after childbirth. Although other studies (Hyde, DeLamater & Hewitt, 1998; Waterstone, Wolfe, Hooper & Bewley, 2003) included evidence of the effect of psychological factors on postpartum sexual function these studies had some limitations. The studies, which used validated measures to evaluate symptoms of depression in postpartum women, lacked standardized tools to assess sexual function (J. Hyde, DeLamater & Hewitt, 1998; Waterstone, Wolfe, Hooper & Bewley, 2003). In contrast, other studies (Elliott & Watson, 1985; Glazener, 1997) that used validated measures for sexual function used nonstandardised tools to assess symptoms of depression.

Sexual problems of postpartum women were less frequently reported in the literature and the relationship between sexual function and postpartum depression was usually taken for granted. Although both sexual dysfunction and depression in postpartum women can affect their quality of life, as well as the mental and physical health of their offspring, partners and the community, up to 25% of postpartum women with health problems did not talk about their challenges after childbirth (Glazener et al., 1995; MacArthur, Lewis & Knox, 1991). In addition, more than half of postpartum depression cases were not recognised because there was no routine assessment of depression in postpartum women (Evins, Theofrastous & Galvin, 2000; Georgiopoulos, Bryan, Wollan & Yawn, 2001). In addition, the majority of the literature on postpartum depression and sexual function did not provide detailed information about the different domains of sexual dysfunction and many of them

lacked sufficient information on other contextual factors that contribute to this problem (Khajehei, Ziyadlou, Safari, Tabatabaee & Kashefi, 2009).

1.2 Terms

The following terms have been defined as noted for the purpose of this study.

Depression: A mental illness that has a substantial influence on all aspects of a person's life, including physical functions, thoughts, mood changes and social interactions (American Psychiatric Association, 2012).

Multiparous woman: A woman who has given birth more than once after the 20th week of pregnancy (Cunningham et al., 2010).

Parity: The number of times giving birth after the 20th week of pregnancy (Cunningham et al., 2010).

Primiparous woman: A woman who has given birth only once to a baby after the 20th week of pregnancy (Cunningham et al., 2010).

Sexual activity: This refers to a single method including vaginal sex, anal sex, oral sex and masturbation, and mixed methods including 'oral and vaginal sex', 'masturbation and vaginal sex', 'masturbation, oral and vaginal sex', 'oral, vaginal and anal sex' and 'masturbation, oral, vaginal and anal sex' (Rosen et al., 2000; Wiegel, Meston & Rosen, 2005).

Sexual behaviour: This refers to the type of involvement in sexual activity, such as wanted/unwanted sexual interactions, risky sexual interaction (such as unprotected sex with strangers), using contraception, single method and mixed method (Vandepitte et al., 2011; Farmer, Trapnell & Meston, 2009).

Sexuality:

Sexuality is a central aspect of being human throughout life and encompasses sex, gender identities and roles, sexual orientation, eroticism, pleasure, intimacy and reproduction. Sexuality is experienced and expressed in thoughts, fantasies, desires, beliefs, attitudes, values, behaviours, practices, roles and relationships. While sexuality can include all of these dimensions, not all of them are always experienced or expressed. Sexuality is influenced by the interaction of biological, psychological, social, economic, political, cultural, ethical, legal, historical, religious and spiritual factors (World Health Organization, 2006).

Sexual health: It is a dimension of sexuality:

A state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationship, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination, and violence. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled (World Health Organization, 2006).

This definition extends the application of sexual health beyond recognition and treatment of sexual difficulties to cover all aspects of human life (Crooks & Baur, 2011). According to Abou-Saleh, Ghubash and Daradkeh (2001) sexual health is strongly associated with self-esteem, which can have substantial effects on general well-being and overall quality of life.

Sexual dysfunction indicates impairment in the normal flow and physiology of sexual function (J. Howard, 2010). It is “a disturbance in the processes that characterise the sexual response cycle or by pain associated with sexual intercourse” (American Psychiatric Association, 2003).

According to many studies, sexual dysfunction is a multifactorial problem. A variety of parameters, such as demographics, quality of relationships (Kadri et al., 2007), physical health status (Salim & Gualda, 2010), surgical and pharmacological treatments (Bergmark, Avall-Lundqvist, Dickman, Henningsohn & Steineck, 1999; Kennedy, Einfeld, Dickens, Bacchiochi & Bagby, 2000), neurological disorders (P. Rees, Fowler & Maas, 2007) and parity (Goetsch, 1999) could affect sexual function of women and disturb their quality of life.

1.3. Rationale

1.3.1 Pregnancy, childbirth and sexual activity

Pregnancy and childbirth are known as “major life stressors” and have been shown to affect women’s sexual function, their mental health status, and their interpersonal relationships (Cunningham et al., 2010; Halford, Petch & Creedy, 2010). The postpartum period commences from the moment of delivery of the placenta and is categorised by the following three time periods: immediate postpartum (after placenta delivery to eighth week), early postpartum (from third to sixth month), and late postpartum (from sixth month on) (Cunningham et al., 2010). The postpartum period is the time of returning to and resuming pre-pregnancy activities, one of which is sexual activity. The resumption of sexual activity after childbirth varies among women and depends on the amount of bleeding, method of delivery, breastfeeding, maternal depression, baby’s temperaments, partner relationship and maternal medical condition (Salim & Gualda, 2010). Although the median time to resume sexual intercourse has been six to seven weeks after childbirth (Goetsch, 1999; Khajehei et al., 2009), sexual activity has been resumed in 90% of women by 16 weeks or the fourth month after childbirth (Byrd, Hyde, DeLamater & Plant, 1998) and the majority of women resumed sexual activity by 24 weeks or the sixth month after delivery (Barrett et al., 2000). However, Morof et al. (2003) reported that in their study of postpartum women in the United Kingdom more than one-third demonstrated symptoms of sexual dysfunction when compared with pre-pregnancy activities.

Sexual difficulties of postpartum women have been reported with varied prevalence in different studies: 5%-35% (caesarean section), 40%-80% (normal vaginal delivery with episiotomy) (Khajehei et al., 2009), and 25.7% (Brown & Lumley, 2000). However, Glazener (1997) reported that 7%-13% of 53% of women who reported problematic coitus during the first eight weeks postpartum sought assistance from their physician. Thus, although women have concerns about postpartum sexual relationships, struggle with sexual difficulties and need information and guidance, it seems that they rarely express these issues during their clinical visits, mainly due to their shyness and modesty (Glazener, 1997; Shojaa, Jouybari & Sanagoo, 2009).

1.3.2 Transition to parenthood and its effects on couple's relationship

Christopher and Sprecher (2000) reported that the sexual relationship was one of the main features of intimate interaction for couples and the more satisfied spouses were with their relationship, the more content they were with their sexual interaction. In addition, Whitehead and Popenoe (2001) emphasised that emotional intimacy was one of the criteria for an ideal relationship. They reported that people like to have an intimate partner with whom they share emotions, thoughts, sorrows and happiness. This type of relationship was achieved by spending considerable time with each other and showing deep affection and love for each other. Lawrence, Rothman, Cobb, Rothman and Bradbury (2008) also reported that couples, who spend more time together, were more satisfied with their relationship.

Kurdek (1993) and Lareau (2003) reported that childrearing and having minor children at home could result in declined relationship satisfaction, which was one of the main characteristics of parenthood. According to Edwards (2009), parents tend to spend more time with their children than they did in the past. Bianchi, Robinson and Milkie (2006) noted that parents expect to be perfect mothers and fathers, and to achieve this goal, they sacrifice the amount of time that they spend with their partners. Zarra Nezhad and Moazami Goodarzi (2011) identified other factors that had an impact on the parent relationship such as social and cultural influences and changes in emotional state and breastfeeding. Furthermore, looking after a baby necessitated large amounts of time, attention and care and was followed by sleep

deprivation for both parents, a major stressor that Hunter, Rychnovsky and Yount (2009) reported. Postpartum physical changes also played an important role in modifying partners' interactions and resulted in changes during parenthood. The interplay of all these factors that emerge during parenthood altered parental norms, and consequently, decreased the quality of the relationship (Zarra Nezhad & Moazami Goodarzi, 2011).

1.3.3 Postpartum depression

The World Health Organization (2007) conceptualises mental health as “a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (World Health Organization, 2007).

Cunningham et al. (2010) identified postpartum depression as the main mental health problem after childbirth. They characterised it by serious mood changes, sadness, hopelessness, worthlessness, fatigue, insomnia, suicidal thoughts and many other psychological symptoms. Postpartum depression was recognised by the Pregnancy Risk Assessment Monitoring System (PRAMS) as the fourth most common issue that needs to be treated rapidly and carefully during the second to ninth month after childbirth (Kanoetra et al., 2007). The prevalence of postpartum depression varied in different studies ranging from 7.1% to 21.8% (Brown & Lumley, 2000; Gavin et al., 2005; Morof et al., 2003; Roomruangwong & Epperson, 2011). Furthermore, it has been shown that depression negatively affected women's general well-being (Laumann, Paik & Rosen, 1999; Mercer, Fenton & Johnson, 2005) and was associated with sexual dysfunction (Perlman et al., 2007).

1.3.4 The link between postpartum depression and sexual dysfunction

The link between symptoms of depression and sexual dysfunction of postpartum women has been identified in the literature (Perlman et al., 2007). Kadri et al. (2007) noted that sexual dysfunction disturbed social functioning and resulted in depression and poor mental health. The relationship between depression and sexual dysfunction

could partly be due to the use of antidepressants, which has been shown to induce sexual difficulties (Clayton et al., 2002; S. Smith, O'Keane & Murray, 2002) and intra- and inter-personal difficulties due to psychological problems (Althof et al., 2005; Basson, Wierman, Van Lankveld & Brotto, 2010). Other studies have demonstrated that psychosocial factors, such as the quality of relationship, emotional distress (Lau et al., 2006), and social problems (Dunn, Croft & Hackett, 1999) could significantly increase the occurrence and frequency of sexual difficulties. Dekel and Solomon (2006) demonstrated that psychiatric disorders, such as a major depressive disorder, panic disorder and obsessive-compulsive disorder, could have significant influences on couples' ability to achieve satisfying relationships, including a satisfying sexual relationship.

Considering that both sexual dysfunction and depression are multifactorial concerns, the assessment of the relationship between postpartum sexual dysfunction and depression should be approached from a multidimensional perspective taking into account hormonal, psychological, physical, physiological, social, medical, relational and spiritual aspects of life.

1.4 Aim and objectives

1.4.1 Aim

The aim of this research was to evaluate the sexual function of postpartum women during the first year after childbirth and to investigate its association with parity, depression and relationship satisfaction.

1.4.2 Quantitative Research Objectives

Objective one

To investigate sexual function of primiparous and multiparous postpartum women during the first year after childbirth and to identify the distribution of sexual problems among the participants.

Objective two

To investigate depression of primiparous and multiparous postpartum women during the first year after childbirth, and to identify the distribution of depression among the participants.

Objective three

To examine the level of relationship satisfaction of primiparous and multiparous postpartum women during the first year after childbirth, and to investigate the distribution of relationship dissatisfaction among the participants.

Objective four

To identify the factors of demographics, obstetrics and gynaecological history, baby's characteristics, medical history, sexual life, symptoms of depression and relationship satisfaction in the occurrence of sexual dysfunction of postpartum women during the first year after childbirth, and to explore the relationships among the respective factors.

1.4.3 Qualitative Research Objectives

Objective one

To investigate factors that contribute to happiness/unhappiness (satisfaction/dissatisfaction) in the sexual relationships of postpartum women during the first year after childbirth.

Objective two

To explore how pregnancy and childbirth influence the sexual function of women during the first year after childbirth.

Objective three

To identify how pregnancy and childbirth influence the mental health of women during the first year after childbirth.

1.4.4 Qualitative Research Questions

1. What are the factors that result in happy (satisfactory) sexual relationships of postpartum women during the first year after childbirth?
2. What are the factors that result in unhappy (dissatisfactory) sexual relationships of postpartum women during the first year after childbirth?
3. What is the relationship between pregnancy and the sexual function of postpartum women during the first year after childbirth?
4. What is the relationship between childbirth and the sexual function of postpartum women during the first year after childbirth?
5. What is the relationship between pregnancy and the mental health of postpartum women during the first year after childbirth?
6. What is the relationship between childbirth and the mental health of postpartum women during the first year after childbirth?

1.5 Overview of the thesis

The organisation of this thesis is as follows:

Chapter 1: In this chapter an introduction to sexual dysfunction and depression after childbirth is provided and the potential association between sexual dysfunction and other elements of life is presented.

Chapter 2: This chapter provides a review of the literature pertaining to sexual function, postnatal depression and relationship satisfaction. The chapter also reviews contextual factors that may affect the association between sexual function, depression and the quality of relationships.

Chapter 3: This chapter describes the methodology of the study. It outlines the survey methodology, data gathering: online questionnaire, list of variables, participants, sample size, instruments, procedures, data analysis, ethical issues and resources.

Chapter 4: In this chapter the results of the quantitative analysis are presented. In addition, issues surrounding the sexuality and mental health of women after childbirth are discussed.

Chapter 5: This chapter provides the findings from the qualitative analysis and similarities and differences between findings of the present study and previous literature are discussed.

Chapter 6: The results of the quantitative component and findings of the qualitative component of the study are discussed and their integration is presented. This chapter also addresses implications of the findings of the study, limitations and recommendations for future studies.

Chapter 2: Background and Literature Review

2.1 Introduction

Postpartum sexual health is a relatively recent research subject (Abdool, Thakar & Sultan, 2009). Regardless of many contextual factors (Hipp, Kane Low & van Anders, 2012), pregnancy per se and transition to parenthood significantly affect the sexual function of postpartum women. Literature has revealed that many women suffer from sexual problems after childbirth and despite this, they rarely seek professional treatment (Abdool, Thakar & Sultan, 2009; Oboro & Tabowei, 2002).

Psychological difficulties, relationship challenges, and physical problems come with parenthood, for both parents but especially for mothers, easily influencing women's sexual function and impairing their quality of life (Chang, Chang, Chen & Lin, 2010; Gjerdingen & Center, 2003). The practical guide of the World Health Organisation (1998) on postpartum care of mother and newborn has emphasised the necessity of giving information or providing counselling services to postpartum women regarding psychological and sexual health, and considered counselling services as one of the "needs of women" (World Health Organization, 1998, p. 1).

For the literature review the following databases were searched: Curtin University Library, Academic Search, Medline, Cinahl, PubMed, Cochrane Library and Google Scholar. The majority of the literature came from peer-reviewed journal articles although a few key books were included.

This chapter reviews available literature on the issues of sexual function, postnatal depression and quality of relationships after childbirth. As the main focus of this study is on the sexual function of postpartum women, the next two sections of this chapter explain the sexual response cycle and female sexual dysfunction. The review then focuses on the effect of pregnancy and childbirth on sexual function of women. This section is followed by a discussion of the mental health of women and the association between sexual dysfunction and symptoms of depression.

The review continues by investigating the multidimensional association of sexual function, depression and relationship satisfaction. The chapter concludes with a review of the literature that investigated contextual factors affecting sexual function, mental health status and relationship satisfaction of women.

2.2 Sexual response cycle

Human sexuality was not scientifically talked about until the 1920s when Hamilton and Macgowen (1929) studied factors involved in the success and failure of marital relationships. In the same year, Davis (1929) wrote about the sexual life of a large group of American women. The issue then lay dormant for almost two decades until two books were published: *Sexual Behaviour in the Human Male* (Kinsey, Pomeroy & Martin, 1948) and *Sexual Behaviour in the Human female* (Kinsey, Martin & Gebhard, 1953). Later, Chesser (1956) published similar data on the relationship between sexual life and marital relationship of English women.

In 1966, William Masters and Virginia Johnson published *Human Sexual Response* (Masters & Johnson, 1966), and *Human Sexual Inadequacy* (Masters & Johnson, 1970) in which they described four separate phases of the human sexual response cycle. The four sequential phases consisted of excitement (arousal), plateau, orgasm, and resolution (Kats, 2009; Masters & Johnson, 1966; Masters & Johnson, 1970). Although their four-phase model described human sexual response, the role of the brain, as an important part of the body in mediating sexual response was not addressed. In 1974, Kaplan presented a three-phase model consisting of desire, excitement and orgasm emphasising the role of the brain in emotion and cognition. Zilbergeld and Ellison (1980) reported a five-part model consisting of desire, arousal, plateau, orgasm, and resolution, covering both physiological and psychological elements. Later, Whipple and Brash-McGreer (1997) proposed a four-phase circular model consisting of seduction (containing desire), sensations (excitement and plateau), surrender (orgasm) and reflection (resolution). Whipple and Brash-McGreer proposed that the conventional linear model of sexual response did not apply to all women and that not all phases of sexual response were experienced by all women.

They emphasised satisfactory sexual experiences as having a significant role in women's sexual response.

Another model for human sexual response was developed by Basson et al. (2000) and it consisted of four phases including desire, excitement, orgasm and resolution: the changes in the body during sexual response that were influenced by the brain. The most recent circular model for female's sexual response cycle suggested by Kammerer-Doak and Rogers (2008) and Frank, Mistretta, and Will (2008) has four main phases including desire, arousal, orgasm, and resolution and this model signifies the role of emotional intimacy and physical and emotional satisfaction in sexual desire, arousal and pleasure.

The human sexual response is a complex cycle in which hormones and central nervous system (CNS) factors are involved. Generally, the human sexual response cycle consists of four main phases incorporating desire, arousal (excitement), orgasm and resolution, and the integration of all four components of this cycle are needed for maintaining satisfactory sexual function (Stuasmire, 2004). All phases of the sexual response cycle can differ from person to person and situation to situation (Crooks & Baur, 2011; Okami & Shackelford, 2001).

The focus of this research is on women's sexual function. Thus, each phase of the women's sexual response cycle is explained to increase the understanding of how each is used for the purpose of this study.

- a. *Desire (Libido)*: Sexual desire, which is the first phase of sexual response cycle, consists of the motivations of sexual activity, sexual urges, fantasies, and wishes (Crooks & Baur, 2011; Kaplan, 1995). A description for desire is a "subjective feeling state that may be triggered by both internal and external cues" (Leiblum & Rosen, 1988, p. 5). Levin (2000) suggested that there were two phases for female sexual desire: phase one was a spontaneous desire which starts before the excitement phase and phase two was provoked by sexual excitement.

- b. *Excitement (arousal)*: The second phase of the sexual response cycle is the excitement phase. The duration of this phase varies from less than a minute to over several hours (Crooks & Baur, 2011). Arousal in women is affected by a group of hormones and chemicals. Androgens provoke arousal through androgen receptors (SR. Davis & Braunstein, 2012; Elaut et al., 2012). Intracellular testosterone is converted into oestrogen and plays a role via oestrogen receptors (Do Rego et al., 2009). Cholesterol also changes to sex hormones (neurosteroids) in the brain (Taubøll, Gregoraszczuk, Kołodziej, Kajta & Ropstad, 2003; Wójtowicz, Goch & Gregoraszczuk, 2005) and influences female arousal. It has also been suggested that nitric oxide (NO) syntase may exist in the clitoral tissue of women and may be involved in sexual arousal (Burnett, Calvin, Silver, Peppas & Docimo, 1997; Park, Moreland, Goldstein, Atala & Traish, 1998).

Due to physical, hormonal and chemical stimulation, the smooth muscle cells around blood spaces in the genital organs dilate and result in the increase of blood inflow. Therefore, the most remarkable changes of the female's genital organs during this phase are engorgement of clitoris and labia minora, and an increase of the length and diameter of both the vagina and clitoris (Crooks & Baur, 2011). Due to these changes, the labia minora becomes inverted and its inner surface exposes (Crooks & Baur, 2011). Furthermore, plasma ultrafiltration in the vagina results in vaginal lubrication which prevents painful penile penetration and enhances the possibility of fertilisation by facilitating movement of the sperm. It should be noted that the amount of lubrication varies from woman to woman and also from situation to situation (Levin, 2002).

Other anatomical changes during female sexual arousal are vaginal enlargement due to contraction of smooth muscles, and uteral and cervical ascension due to contraction of levator ani muscles, which result in 'vaginal tenting' (Shafik, 1995). These changes help the glans of the penis rub on the vaginal wall less severely and postpone male ejaculation. Accordingly, the female partner has enough time to experience more sexual pleasure. In addition, vaginal tenting can facilitate enough space for semen to travel during liquefaction (Levin, 2003).

Vasocongestion of the skin makes it turn red or pink especially on the face, chest and breasts, known as 'sex flush'. There can also be nipple erection, which happens because the smooth muscles contract (Crooks & Baur, 2011).

- c. *Orgasm (climax)*: During this phase, sexual tension continues to grow. All events that happened in the excitement phase keep progressing and become more striking and noticeable until the end of the orgasm phase. The increase in muscle tone, heart and breathing rates, and blood pressure continues. During the early orgasm phase, which has been reported as the 'plateau phase' or 'orgasmic platform', sex flush and the dark colour of the genitals become more remarkable (Crooks & Baur, 2011).

The main characteristic of the orgasm phase is the peak of sexual pleasure with rhythmic contractions of the genital muscles. The duration of this phase may be as short as two seconds or as long as a few minutes. Some women have reported that the longer this phase lasts, the more intense is their orgasm (Crooks & Baur, 2011). It has also been reported that some women experience multiple orgasms during sexual activity (Levin, 2007, 2009). Nevertheless, multiple orgasms are more likely to happen during partnered sexual activity than by masturbation (Haning et al., 2008).

- d. *Resolution*: The final phase is resolution, during which a general sense of relaxation and well-being is experienced. All changes that happened during the orgasm phase decrease immediately after climax. All labial, vaginal and clitoral engorgement, nipple erection and myotonia subside. Heart and breathing rates and blood pressure revert to normal condition, and sex flush vanishes rapidly (Crooks & Baur, 2011). After that, women remain on "red alert" and are not arouseable for a limited period of time (Kats, 2009).

2.3 Female sexual dysfunction

Sexual dysfunction is a prevalent problem among women of all ages that has negative impacts on their quality of life (Chao et al., 2011; Tripoli et al., 2011). Based on the three-phase model of sexual response cycle introduced by Kaplan (1974), the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, third revision (DSM-IV-TR) (American Psychiatric Association, 2000) has classified the disorders of female sexual dysfunction as follows: hypoactive sexual desire disorder; sexual aversion disorder; sexual arousal disorder; orgasmic disorder; dyspareunia; vaginismus; sexual dysfunction due to a general medical condition; substance-induced sexual dysfunction; and sexual dysfunction not otherwise specified. The sexual disorders classification in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013) was under review at the time of the present study.

The World Health Organisation International Classification of Diseases-10 (ICD-10) (1993) identified several criteria for sexual dysfunction:

- a. the subject is unable to participate in a sexual relationship as he or she should wish;
- b. the dysfunction occurs frequently, but may be absent on some occasions;
- c. the dysfunction should not be entirely attributable to any of the other mental and behavioural disorders in ICD-10, physical disorders (such as endocrine disorder) or drug treatment (Sadock & Sadock, 2007, p. 705; World Health Organization, 1993)

The ICD-10 classified female sexual dysfunction as follows: lack or loss of sexual desire; sexual aversion and lack of sexual enjoyment; failure of genital response; orgasmic dysfunction; nonorganic vaginismus; nonorganic dyspareunia; excessive sexual drive; other sexual dysfunction, not caused by organic disorder or disease; and unspecific sexual dysfunction, not caused by organic disorder or disease (World Health Organization, 1992).

To fully understand the nature of each of the four female sexual dysfunction disorders including sexual desire disorder, sexual arousal disorder, orgasmic dysfunction and sexual pain disorder (Kats, 2009; Masters & Johnson, 1966; Masters & Johnson, 1970), the main subcategories of each disorder are discussed in the next section.

2.3.1 Sexual desire disorder

Sexual desire disorder is generally divided into three main subcategories. They are: 1) hyperactive sexual desire disorder; 2) hypoactive sexual desire disorder; 3) sexual aversion disorder (the phobic avoidance of sex) (Kaplan, 1995).

Hyperactive sexual desire disorder

Hyperactive sexual desire disorder, which is also known as ‘sexual compulsion’, is identified as having an uncontrollable desire for sex and participating in sexual activities to the extent that they interfere with normal daily life, work, and relationships. People presenting this condition usually are reported to have high levels of sexual interest, feelings, and fantasies. They are aroused in response to any erotic and even nonerotic stimuli, and usually show compulsive sexual behaviours (Kaplan, 1995).

Hypoactive sexual desire disorder

Hypoactive sexual desire disorder (HSDD) is described as a deficiency or decline of sexual feeling, interest, thoughts, fantasies and desire that is beyond a normal decrease of sexual desire. Women experiencing sexual desire disorder lack motivation for sexual activity, have the least amount of incentive to become sexually aroused, and are not receptive to sexual stimulations and activities (Jha & Thakar, 2010).

Sexual aversion disorder

Sexual aversion disorder is the phobic disgust of partnered sexual activity and the avoidance of genital contacts with a sex partner, which results in emotional distress, extreme anxiety, and interpersonal difficulties. Women experiencing sexual aversion disorder may have a strong sexual desire and masturbate to orgasm, but they have a fear of being touched by others in the genital area (Brotto, 2010; Kaplan, 1987). This problem may develop with all sexual interactions, or it may be situational and experienced in only specific individual cases (Brotto, 2010).

2.3.2 Sexual arousal disorder

Sexual arousal disorder is described as “the persistent or recurrent inability to attain or maintain sufficient sexual excitement, causing personal distress” (Aslan & Fynes, 2008, p. 294). It may be recognised by a lack of sexual pleasure and not being aroused by genital and nongenital stimuli (subjective sexual arousal disorder), or it can be identified by lubrication difficulties and the least possible vulval swelling (genital sexual arousal disorder) (Jha & Thakar, 2010).

2.3.3 Orgasmic dysfunction

Women suffering from this problem either have difficulty reaching orgasm or do not experience orgasm during sexual activity in spite of sexual stimulation and being highly aroused. This problem can cause remarkable personal and interpersonal distress, and can seriously influence women’s quality of life and general well-being (Jha & Thakar, 2010; Rellini & Clifton, 2011).

2.3.4 Sexual pain disorder

Based on the publications from the International Consensus Development Conference (Basson et al., 2000), this problem is subdivided into two main categories: vaginismus and dyspareunia. The two problems may be experienced independently, or they may be interrelated (Abdool et al., 2009).

Vaginismus

Vaginismus is repeated or permanent involuntary contractions of muscles of the lower third of the vagina that hinder penile penetration and induces inter- and intrapersonal distress (Aslan & Fynes, 2008). The link between psychological factors and vaginismus has been reported by Watts and Nettle (2010). Research also suggested that there may be an overlap with sexual aversion disorder and vaginismus (Binik, 2010).

Dyspareunia

Dyspareunia is repeated or permanent pain in female genital area from sexual intercourse (Aslan & Fynes, 2008). Abdool et al. (2009) reported that there is a lack of research about this problem during postpartum. However, Rogers, Borders, Leeman, and Albers (2009) suggested that perineal pain is common during the postpartum period and that it can interfere with normal sexual function after childbirth.

2.3.5 Prevalence

In spite of the high importance and extent of the problem, there is controversy regarding the prevalence of female sexual dysfunction. According to different studies, female sexual dysfunction has a prevalence rating from 25.8% to 91% (Echeverry, Arango, Castro & Raigosa, 2010; Geiss et al., 2003; Ishak, Low & Othman, 2010; Mercer et al., 2005; Nazareth, Boynton & King, 2003; Nusbaum & Gamble, 2001). In a systematic review of previous prevalence studies, it was reported that the mean prevalence of sexual desire disorder, arousal disorder, orgasmic disorder and sexual pain were 64%, 31%, 35%, and 26%, respectively (Hayes, Bennett, Fairley & Dennerstein, 2006).

Generally, the most prevalent types of sexual problems among women throughout the world have been reported to be 'low sexual desire' (ranging from 26%- 43%) and 'orgasmic dysfunction' (ranging from 18%-41%) (Seftel, 2005).

A population-based study in Australia reported that more than half of the population of Australian women (60%) experienced at least one form of sexual dysfunction (Najman, Dunne, Boyle, Cook & Purdie, 2003). Najman, Dunne, Boyle, Cook, and Purdie also reported that the prevalence of sexual dysfunction was higher among women who experienced physical and emotional health problems. In addition, Richters, Grulich, de Visser, Smith, and Rissel (2003) reported that lack of sexual desire (54.8%), difficulty to reach orgasm (28.6%), lack of sexual pleasure (27.3%), and painful intercourse (20.3%) were the most prevalent types of sexual disorders among Australian women.

Recent studies in China reported that 50% of Chinese women in the study suffer sexual dysfunction (A. Zhang, Pan, Chen, Pan & Kan, 2011; H. Zhang & Yip, 2012). A Korean study reported similar results to the Chinese studies: 50% of the population of Korean women in the study experienced sexual difficulties. In another Korean study (S. Song, Jeon, Kim, Paick & Son, 2008), the prevalence of self-reported sexual dysfunction was 17.7% but the rate of sexual dysfunction when scored using the Female Sexual Function Index (FSFI) was 43.5%. The most prevalent types of sexual dysfunction were arousal disorders (49%), lubrication problems (45.4%), and hypoactive sexual desire disorder (44%). In Malaysia, the prevalence of sexual dysfunction was 25.8% with higher prevalence of hypoactive desire disorder (39.3%), arousal problem (25.8%), lubrication difficulties (21.5%), and sexual dissatisfaction (21.5%) (Ishak et al., 2010).

An Iranian study (Vahdaninia, Montazeri, and Goshtasebi, 2009) reported that at least one form of sexual dysfunction was experienced by 51% of Iranian women aged 15 and over. The prevalence of female sexual dysfunction among Indian women was reported by Singh, Tharyan, Kekre, Singh, and Gopalakrishnan (2009) as 73.2%. The most prevalent types of sexual dysfunction among Indian women were lubrication difficulties (96.6%), arousal problems (91.3%), orgasmic dysfunction (86.6%) and low sexual desire (77.2%). The study reported that 81.2% of Indian women were not satisfied with their sexual life. Different findings from a later study (Varghese, Bansal, Kekre, and Jacob, 2012) reported that 16.67%,

14.67% and 18% of Indian women experienced hypoactive desire disorder, arousal disorder and orgasmic disorders, respectively.

Sexual function of Arab-speaking women was investigated in a multi-country study in which 2920 women from Egypt, Saudia Arabia, Libya, Tunisia, Algeria, Morocco, Sudan, Yemen, Palestine, Lebanon, Jordan, Syria, Iraq, Kuwait, Qatar, United Arab Emirates and Bahrain participated. Findings of the study revealed that the average prevalence of sexual dysfunction was 59.1% (Shaeer, Shaeer & Shaeer, 2012).

Studies investigating the prevalence of female sexual dysfunction in European countries have yielded various results. In a study conducted by Goldmeier, Judd, and Schroeder (1998) in the United Kingdom, 11-20% of women who were referred to a military clinic reported sexual dysfunction. Mercer et al. (2003) reported that 53.8% of British women suffered at least one form of sexual difficulty. In a later study by Burri and Spector (2011) in the UK, 15.5% of women reported that they experienced a lifelong sexual dysfunction, sexual desire disorder being the most prevalent. A study by Wallwiener, Seeger, Mück, Bitzer, and Wallwiener (2010) uncovered that female sexual dysfunction occurred among 32.4% of German women. They also reported that the prevalence of orgasmic problems, hypoactive desire disorder, lubrication difficulties, pain during intercourse and sexual dissatisfaction was 8.7%, 5.8%, 1.2%, 1.1% and 2.6%, respectively. Hypoactive sexual desire disorder has been reported as the most prevalent type of sexual dysfunction (11.2%) among Danish women (Ventegodt, 1998). Among Turkish women, vaginismus (75.9%), dyspareunia (47.2%), orgasmic disorder (22.2%) and sexual desire disorder (16.6%) have been reported as being the most prevalent types of sexual disorders (Dogan, 2009).

More than half or 56.8% of women living in Latin American countries and 30% of Colombian women have been reported to suffer sexual dysfunction (varied from 21.0%-98.5% based on the country) (Blümel et al., 2009; Echeverry, Arango, Castro & Raigosa, 2010). In the USA National Health and Social Health Survey (Lauman, Paik, & Rosen, 1999), 1749 women from various social groups were recruited to measure the prevalence of sexual dysfunction. This study was recognised as the best

study of its kind because it employed the most rigorous methodological approaches and the participants were demographically representative of the entire population of the USA. Lauman, Paik, and Rosen reported that sexual dysfunction affected 43% of USA women, and they reported that this problem was more prevalent among those suffering from physical and emotional health problems. In a later study by Shifren, Monz, Russo, Segreti, and Johannes (2008), the prevalence of sexual problems among women in the USA was reported to be 44.2%. They reported that low desire for sex was the most prevalent type of dysfunction (38.7%) followed by low arousal (26.1%) and orgasm difficulties (20.5%). Their results were consistent with those of the previous study by Laumann et al. (1999) in which 43% of women reported sexual dysfunction.

As can be seen from the literature, there is a lack of consensus globally on the prevalence of female sexual dysfunction and its subcategories. The variation may be a result of different methodological approaches, various data collection instruments, different sample selection processes (Aslan & Fynes, 2008), women's genetic variations (Dawood, Kirk, Bailey, Andrews & Martin, 2005), cultural or religious differences (Sanchez, Kiefer & Ybarra, 2006), socioeconomic variations and environmental differences (Witting et al., 2009), and women's knowledge of their own sexuality (Wade & Brown, 2005).

2.4 Pregnancy and childbirth

Pregnancy and childbirth influence sexual function of postpartum women. Interest in sexual activity can be altered during and after pregnancy due to many factors including hormonal, psychological, physical, physiological, social, medical, relational and spiritual changes. The influence of these important changes on women's sexual behaviour and the parent's sexual relationship during pregnancy and after childbirth has been documented in the literature (Pauleta, Pereira & Graça, 2010). The next three sections provide a review of the literature and a discussion of the issues.

2.4.1 Effects on sexual function

Sexual function of women comprises desire, excitement, orgasm and resolution. A disturbance in any of these elements results in female sexual dysfunction (Sadock & Sadock, 2007). In spite of the importance of sexuality, it is not among the various topics that are routinely discussed during postnatal visits. Although women experience various types of sexual difficulties during pregnancy that result in emotional distress, they prefer not to discuss them with a doctor or midwife perhaps due to their shyness and embarrassment as reported by Shojaa, Jouybari, and Sanagoo (2009). It has been reported that 88.9% of women who experienced different types of sexual difficulties during pregnancy did not consult professionals regarding changes in their sexual function (Bartellas, Grane, Daley, Bennett & Hutchens, 2000; Glazener, 1997).

Cultural factors, embarrassment, lack of knowledge and time limitation of each visit have been reported to be potential barriers to discussing sexuality during pregnancy and also after childbirth (Pauleta et al., 2010). Other research by Olsson, Robertson, Falk, and Nissen (2011) revealed that sexual function of postpartum women was discussed only if the woman expressed concerns in this regard, or if the midwife noticed that the woman wanted to talk about it.

Pregnancy per se was associated with a decrease of 57-75% in the sexual desire of women (Bogren, 1991; Sayle, Savitz, Thorp, Hertz-Picciotto & Wilcox, 2001). Immediately after birth the level of sexual desire is believed to be much lower than that of before and during pregnancy; however, 80-90% of women restarted sexual activity within three months postpartum in the study by Raina et al. (2007).

In another study, Pauleta, Pereira, and Graça (2010), investigated the sexual function of women during pregnancy. They demonstrated a remarkable decline in the sexual activity of participants during pregnancy compared to before pregnancy. In addition, during the third trimester of pregnancy, 27% of women suffered sexual dissatisfaction, 10.9% experienced low sexual desire, 9.8% reported dyspareunia, 6.6% had orgasmic problems and 55% experienced a decrease in sexual activity.

Although Pauleta et al. (2010) did not use a validated tool to measure the sexual function of women, their findings supported results of previous research in which a decrease in sexual activity and the existence of different degrees of sexual dysfunction during pregnancy were documented (Pauls, Occhino & Dryfhout, 2008; Shojaa et al., 2009).

In the study by Pauls, Occhino, and Dryfhout (2008) in the USA, four validated questionnaires were used including: 1) the Female Sexual Function Index-19 to evaluate sexual function of participants; 2) the Body Exposure during Sexual Activities Questionnaire-28 to assess anxious/avoidant body focus during sexual activity; 3) the Incontinence Impact Questionnaire-7 to assess life impact associated with incontinence; 4) the Fecal Incontinence Quality of Life-29 to assess the domains of quality of life negatively affected by fecal incontinence. Findings of the study showed that the sexual function of women did not return to its normal level until six months postpartum. Although Pauls et al. (2008) used validated questionnaires, the majority of the women in their study were unmarried so that the physical and emotional burden of being a single mother could have affected their sexual function. In addition, the researchers did not evaluate the effect of relationship satisfaction on women's sexual function.

In a prospective study in the USA (Brubaker et al., 2008), 546 postpartum women who suffered anal sphincter laceration were studied regarding their sexual function six months after childbirth. Sexual function of participants was explored by the use of Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12). Two validated questionnaires including the Medical Epidemiological and Social Aspects of Aging and the Modified Manchester Health Questionnaire were also used to assess urinary incontinence and fecal incontinence, respectively. Results of the study showed that 90.2% of women had sexual activity at sixth month postpartum and the resumption of sexual activity was related to marital status. Women who were sexually inactive but had a sexual partner reported having more painful intercourse and a lower sexual desire. In addition there was less prevalent sexual activity among women who had sphincter tears during delivery than those without delivery-related sphincter laceration. One of the limitations of the study by Brubaker et al. was that

they failed to demonstrate the role of breastfeeding in postpartum sexual dysfunction as Signorello, Harlow, Chekos, and Repke (2001) reported that physiological changes in the body due to breastfeeding (the decrease of oestrogen and androgens) decreased sexual desire and also induced vaginal dryness and dyspareunia. In addition, Brubaker et al. did not investigate the influence of depression on the level of sexual desire in postpartum women or the influence of other contextual factors such as parity and women's medical condition (Fatemi & Taghavi, 2009; Tripoli et al., 2011; Warren et al., 2011).

Furthermore, the findings of the study by Brubaker et al. were in contrast with those of an earlier study by Connolly, Thorp and Pahl (2005) in which the sexual function of women at six months after childbirth was the same as before pregnancy. In their study, the resumption of sexual activity after delivery was not associated with the mode of delivery and episiotomy, and the orgasmic function of women improved after childbirth compared to prior to pregnancy. Nevertheless, they did not investigate the role of relationship satisfaction.

2.4.2 Effects on sexual behaviour

Sexual behaviour refers to a wide range of activities including mating behaviour (finding or attracting partners) and sexual interactions between individuals (Bailey, 2009). The literature shows pregnancy and childbirth affect the sexual behaviour of women in different ways.

In the study by Pauleta et al. (2010), vaginal intercourse was most frequent during pregnancy (98.3%), and anal sex was least frequent (6.6%). Similarly, in another study by Sydow, Ullmeyer and Happ (2001), it was documented that vaginal intercourse and masturbation were the two most prevalent and anal sex was the least practiced during pregnancy. Sydow et al. also reported that although there was no difference in the prevalence of female masturbation before and during pregnancy, it decreased to 'not at all' during the first three months after childbirth, and started to increase afterward. In contrast, previous studies by Byrd, Hyde, DeLamater, and Plant (1998) and Sydow (1999) reported a remarkable decline in masturbation during

pregnancy. Similarly, in another study by Fok, Chan, and Yuen (2005), none of the participants practiced anal sex during pregnancy and the frequency of all other kinds of sexual behaviours (vaginal intercourse, oral sex, masturbation, and breast stimulation) decreased during pregnancy compared with before pregnancy.

The study by Olusegun and Irete (2011) demonstrated that the majority of pregnant women had sexual activity at least once per week. The reasons why women did not have any type of sexual activity during pregnancy were reported as 'being uncomfortable', 'not being appealed by sex during pregnancy', and 'having fear of potential fetal harm caused by intercourse'. More than two-thirds (66.7%) of the women had never practiced oral sex and 7.2% had infrequent anal sex during pregnancy. Olusegun and Irete also showed that being a first time mother, having a history of miscarriage and having a higher level of education influenced the type of sexual behaviours of women during pregnancy. First-time mothers with a history of abortion and tertiary education had less information about basic guidelines on sex during pregnancy and were more likely to either abstain from sex or not practice any form of sexual activity other than vaginal intercourse. However, earlier research by Haines et al. (1996) did not show an association between the type of sexual behaviour and mother's age, parity, education, and employment status.

2.4.3 Effects on parent's intimate relationship

It has been indicated that the parents' sexual relationship can be influenced by pregnancy and childbirth. Indeed, adapting to a life with a new baby while coping with new responsibilities, lack of sleep and taking care of the baby can distract parents, especially mothers, from having sex since they have reported they were too tired to think about sex (Olsson, Robertson, Björklund & Nissen, 2010; Pastore, Owens & Raymond, 2007).

Most women preferred to postpone sexual activity until six weeks after delivery or when the genital organs return to pre-pregnancy condition (Serati et al., 2010). Nevertheless, the study by Belentani, Marcon and Pelloso (2011) showed that a significant number of women resumed sexual activity before six weeks after

childbirth. Although sexual activity can be considered to augment a couple's emotional relationship, earlier studies by Andrews, Thakar, Sultan, and Jones (2008) and Khajehei et al. (2009) reported that the majority of women preferred to resume sex later after childbirth when they did not have lochia, their emotional status was more balanced, a contraceptive method was being used, the perineum was healed and the baby's condition was more stable.

Brown and Lumley (2000) reported that relationship problems were associated with sexual problems at seven and nine months after childbirth. This finding was corroborated by the later study of De Judicibus and McCabe (2002), which indicated that women who were less satisfied with their relationships had less sexual desire and frequency than those who had marital satisfaction at three months postpartum. De Judicibus and McCabe used the Work-role scale and Mother-role scale to assess the quality of both roles as a worker and a mother, respectively. The Edinburgh Postnatal Depression Scale-10 was used to evaluate symptoms of depression and the Fatigue Scale-11 was applied to explore the subjective perception of fatigue and its severity. Moreover, selected questions from the Sexual Function Scale were used to assess sexual desire and level of relationship satisfaction. They also used the Sexual Dysfunction Scale to investigate the sexual satisfaction of women. Findings revealed that the sexual desire of women decreased the most during the third trimester of pregnancy. The level of sexual desire and sexual intimacy was higher among non-pregnant women than pregnant ones. Nevertheless, pregnant women were more satisfied with their relationships than non-pregnant women. De Judicibus and McCabe concluded that maintaining a satisfying relationship with one's partner during pregnancy becomes more important than engaging in sexual activity. This finding was corroborated by the results of another study by Sagiv-Reiss, Birnbaum and Safir (2011) in which a decline in sexual satisfaction during pregnancy did not affect relationship satisfaction. Interestingly, in spite of a decline in sexual satisfaction during pregnancy, pregnant women showed higher levels of love and emotion for their partners compared to non-pregnant women. This was explained by the higher need for relational security during and after pregnancy. Pregnant women were more sensitive about the quality of their relationship as they wanted their baby to have two caregivers or to receive affection and love from both parents. Therefore,

in spite of a decrease in sexual satisfaction, pregnancy enhanced the couples' relationship (Sagiv-Reiss, Birnbaum & Safir, 2011).

2.4.4 Prevalence of sexual problems after childbirth

There is limited research that specifically investigated postpartum sexual problems, and the available literature lacked sufficient epidemiological data on the problem of sexual desire of women after childbirth (Moel, Buttner, O'Hara, Stuart & Gorman, 2010). Barret (2000) reported that 53% of women lacked sexual desire three months after childbirth, 37% of them still reported the response after six months postpartum. The study by Oboro and Tabowei (2002) demonstrated a loss of desire in 61% of women after six weeks postpartum and 26% of them at six months after delivery. An Australian population-based study by Najman et al. (2003) also revealed that a lack of interest in having sexual activity was the most common comment made by women during the postpartum period.

Oboro and Tabowei (2002) also documented postpartum sexual arousal disorder of Nigerian women. They reported the prevalence to be 51%, 29% and 13% at the sixth week, third and sixth months after childbirth, respectively.

In an USA study, Rosen (2000) reported that 10-15% women had difficulty reaching orgasm. This problem was reported as the second most common problem of postpartum women by Najman et al., (2003) and was experienced by 11-41% of women in the study by Rellini and Clifton (2011).

Sexual pain disorder is one of the most common problems of women during postpartum period and it was reported by 10% to 15% of women in Rosen's (2000) study. Glazener (1997) and Glazener et al. (1995) reported that 42% of women suffered perineal pain immediately after childbirth, and 10% of them still experienced this problem at the twelfth week postpartum. Furthermore, Glazener (2005) reported that primiparous women were at greater risk of postpartum dyspareunia than multiparous women. Other studies have shown a prevalence of

62% (Barrett et al., 2000) and 68% (Oboro & Tabowei, 2002) of dyspareunia among postpartum women during the first 6 months after delivery.

The most common causes of postpartum perineal pain have been reported to be instrumental childbirth, perineal trauma, and episiotomy (Glazener, 1997; Glazener et al., 1995). A correlation between perineal trauma, perineal pain, and the late resumption of sexual activity after childbirth has been reported in the literature. In a retrospective cohort study, primiparous women whose perineum remained intact demonstrated less symptoms of dyspareunia after childbirth (Signorello et al., 2001). In addition, in a survey of 304 Mexican postpartum women (Solana-Arellano et al., 2008), 41.3% had difficulties with sexual function and suffered dyspareunia between the third and sixth months after delivery. This problem was significantly associated with episiotomy and breastfeeding.

Nevertheless, this correlation has not been documented in other studies. Andrews, Thakar, Sultan, and Jones (2008) showed no difference between women with perineal trauma and women without perineal trauma regarding the resumption of sexual activity as 40% had recommenced sexual activity at the seventh week postpartum regardless of their perineal trauma. In addition, no correlation was found between dyspareunia and perineal trauma. In another study, Rogers, Leeman, Migliaccio, and Albers (2008) found no difference between women with perineal trauma and women with intact perineum regarding the report of postpartum sexual pain. The inconsistencies in the literature magnify the need for further research on the prevalence of sexual dysfunction in postpartum women.

2.5 Mental health of postpartum women: postnatal depression

The postpartum period is a critical phase in women's lives during which women can encounter dramatic changes in their health status. Mental health of postpartum women may be affected by many factors some of which are biochemical factors such as hormonal changes, lack of nutrients, life stressors, life style changes, postpartum morbidities, maternal medical conditions, and newborn's health problems

(Cunningham et al., 2010; Nunes et al., 2010; Righetti-Veltema, Conne-Perréard, Bousquet & Manzano, 1998).

Moses-Kolko et al. (2012) reported that during the early postpartum period women were at greater risk of affective and psychotic disorders. The main cause of maternal mortality between six weeks and one year after childbirth in the United Kingdom and Australia has been reported to be psychiatric illnesses. The risk is even greater if there is a pre-existing psychiatric disorder or mental illness (Austin, Kildea & Sullivan, 2007).

Postpartum depression has been reported as the most prevalent mental illness after childbirth in the United States (USA) that may last weeks to years after delivery (Goodman, 2004; Horowitz & Goodman, 2004). The destructive effects of postpartum depression on a woman's life not only disturbed the physical and mental health of the mother, her partner and her children, but also imposed economic pressure on the entire family. Health service expenditures have been shown to be 90% higher among depressed mothers in the USA and were associated with older age and lower family income (Dagher, McGovern, Dowd & Gjerdengen, 2012).

Research has shown that 11-18% of USA women suffer postpartum depression (Center for Disease Control and Prevention, 2009), and 33% and 38% of women at the fifth and ninth months postpartum, respectively, experience symptoms of depression (Gress-Smith, Luecken, Lemery-Chalfant & Howe, 2011). Results of an Australian study (Brown & Lumley, 2000) revealed that 16.9% of women demonstrated symptoms of depression at the second week after delivery. Leung and Kaplan (2009), however, reported the actual prevalence of postpartum depression was unknown and that this problem has usually been underestimated or underdiagnosed due to factors such as women's reluctance to express their feelings, cultural factors and lack of follow-up visits after childbirth.

Postpartum depression not only affects women's quality of life but also has negative impacts on the mental health of their partners and the intellectual and physical development of their children (Cooper & Murray, 1998; Gress-Smith, Luecken,

Lemery-Chalfant & Howe, 2011), and should be recognised as early as possible after childbirth. Early postpartum screening was reported to help identify women at risk in the study by Gjerdingen, Crow, McGovern, Miner, and Center (2009). These researchers recruited 506 postpartum women who referred to clinics for initial well-child visits at 0-1 month after birth. Participants completed the Structured Clinical Interview for DSM-IV, Patient Health Questionnaire-2 (PHQ-2) and Patient Health Questionnaire-9 (PHQ-9) at the initial visit (0-1 month postpartum) as well as at two, four, six and nine months postpartum. Findings of their study revealed that 4.6% (20 participants) and 8.9% (45 participants) of women were diagnosed with major depression at 0-1 month after childbirth and at later phases of the study, respectively. Symptoms of depression during the early postpartum period have been investigated in other studies. Five hundred women at 5-12 weeks postpartum who participated in a study by Yawn et al. (2009) completed the Edinburgh Postnatal Depression Scale and the Patient Health Questionnaire-9. Based on the scores of the two instruments, 15.2% of the women had increased risk of postnatal depression.

2.6 Depression and sexual dysfunction: an association

One of the most important organs in the body that regulates the sexual response cycle is the brain. Several parts of the brain, including the cerebral cortex, limbic system and hypothalamus in addition to neurotransmitters (dopamine and serotonin), are involved in controlling and directing sexual function, sexual response, and sexual behaviour. Even in the absence of physical stimulation, people can become sexually aroused and reach orgasm by having only sexual thoughts and sexual fantasy (Whipple, Ogden & Komisaruk, 1992).

The brain also regulates and controls emotions, thoughts and mental health. Any factor that affects the health of the brain has a substantial impact on one's mental health and the ability to function. Mental illness is considered a condition which has negative influences on thoughts, emotions and behaviours, and disrupts interpersonal relationships. Research has shown that people with mental illness showed substantial alterations in the structure, chemistry and function of their brain (Siegel, 1999;

Spenrath, Clarke & Kutcher, 2011). This brief explanation highlights the potential connection between mental health problems such as depression and sexual function.

Depression has been shown to negatively affect women's sexuality (Laumann et al., 1999; Mercer et al., 2005), be associated with sexual dysfunction in psychiatric patients (Perlman et al., 2007) and be related to risky sexual behaviour (Smit et al., 2006). The relationship between depression and sexual dysfunction may be partly due to the use of antidepressants, which can induce sexual difficulties (Clayton et al., 2002; S. Smith et al., 2002), and also due to intra- and interpersonal difficulties resulting from psychological problems. Other contextual factors, such as poor quality of relationships, emotional distress (Lau et al., 2006) and social problems (Dunn et al., 1999) significantly increased the occurrence and frequency of sexual difficulties. Psychiatric disorders, such as major depressive disorder, panic disorder, obsessive-compulsive disorder, anorexia nervosa and schizophrenia, also had significant impacts on couples' ability to achieve satisfying sexual relationships (Dekel & Solomon, 2006).

According to the American Psychiatric Association (2003), assessing the psychological status of individuals has been essential while making an effort to diagnose sexual difficulties. Several studies (Chivers, Pittini, Grigoriadis, Villegas & Ross, 2011; Davison, Bell, LaChina, Holden & Davis, 2009; Lanza di Scalea, Hanusa & Wisner, 2009) have shown a relationship between female sexuality and symptoms of depression, which implies that women's sexuality affected their mental health status and their mental health status influenced their sexuality. These studies are discussed in the following two sections.

2.6.1 Sexual function of depressed women

In a case-control study by Azar, Noohi, and Shafiee Kandjani (2007), using a convenience sampling method, 156 outpatients were recruited who presented any of the following: depression, aggression, phobia, anxiety and somatic complaints. The mental health of participants was examined using Check-List-90-Revised (SCL-90-R), and their sexuality was evaluated by means of a self-created questionnaire according to criteria of the Diagnostic and Statistical Manual of Mental Disorders,

4th Edition (DSM-IV). A control group consisting of healthy women was administered the same two questionnaires. Results of the study revealed that participants who had depression were more likely than healthy women to suffer sexual difficulties (91.5% vs. 66.7%, respectively), and the rates of sexual desire disorder and orgasmic dysfunction were higher among these participants. Also, those with somatic complaints had higher levels of sexual desire disorders and dyspareunia, those with depression had more prevalent sexual arousal disorders, and those suffering phobia were more likely to experience orgasmic disorders. These findings were supported in a later study by Shifren et al. (2008) in which depression was related to the increased prevalence of desire disorders, arousal problems and orgasmic difficulties.

A recent Canadian study by Chivers, Pittini, Grigoriadis, Villegas, and Ross (2011) has corroborated the results of previous research, emphasising the impact of postpartum depression on the sexual function of women. Chivers et al. (2011) used the Edinburgh Postnatal Depression Scale to assess postpartum depression and the Female Sexual Function Index to evaluate sexual function. They achieved a response rate of 65% and of these 37 women, 19.4% had symptoms of postpartum depression. They showed that 65% of the 37 women experienced sexual dysfunction and the seven depressed women had poorer sexual function than non-depressed ones. Although both depressed and non-depressed women reported a lack of sexual desire, depressed women were more likely than non-depressed ones to suffer sexual arousal disorder, lubrication difficulties, orgasmic dysfunction, painful intercourse, and sexual dissatisfaction. These findings supported previous studies by Huang and Mathers (2006) and Lanza di Scalea, Hanusa and Wisner (2009), which reported that postpartum depression had deteriorating effects on sexual function. Chivers et al. (2011) also reported that depressed and non-depressed women differed in terms of sexual abstinence, as depressed women were more likely to abstain from sex. This finding corroborated the findings of an earlier study by Dolezal et al. (1998), which reported a link between a depressive mood and abstinence from sexual activity.

2.6.2 Depressive symptoms associated with sexual dysfunction

Sexual function can also influence postpartum mental health. In other words, women who have sexual problems after childbirth may experience higher rates of postpartum depression (Brown & Lumley, 2000). In their study, Osborn et al. (1988) showed a statistically significant association between women's sexual dysfunction and psychiatric disorder, neuroticism, and marital disharmony. In addition, Dennerstein et al. (2006) reported that women with a hypoactive sexual desire disorder were more likely than women with normal desire to suffer emotional and psychological distress. In a population-based study by Kadri et al. (2002), it was noted that women, who had negative attitudes towards sexual intercourse, had higher levels of depressive symptoms than other women.

Sexual dissatisfaction has also been shown to be related to lower psychological well-being in women in the study by Davison, Bell, LaChina, Holden, and Davis (2009). They recruited 421 Australian women aged 18-65 years to record their sexual activity in a sexual diary and also express their satisfaction or dissatisfaction with their sexual life. The women also completed the Beck Depression Inventory (BDI) and the Psychological General Well-being Index. Results demonstrated that women, who were more satisfied with their sexual life, had higher scores on positive well-being. In addition, the psychological health status of women who were less satisfied with their sexuality was worse than that of sexually satisfied women. Davison et al. (2009) conceded that there was a complex relationship between sexual health and psychological well-being and that many other factors, such as demographic parameters, medications and emotional factors, could contribute to this relationship. Nevertheless, they did not examine the role of these factors. Moreover, many participants were excluded from the study because a minimal level of sexual activity of at least once per fortnight was required to be eligible.

In summary, a review of the literature showed that there was an inconsistent association reported between sexual dysfunction and depression. Although some research had shown that there was a significant relationship between depression and sexual dysfunction (Frohlich & Meston, 2002; Vulink, Denys, Bus & Westenberg,

2006), reports from the study by Song, Jeon, Kim, Paick, and Son (2008) showed that sexual dysfunction did not always influence the mental health status of women and did not induce depressive symptoms. In addition, there was a contradiction between the prevalence of “self-reported sexual dysfunction” and that of “questionnaire based sexual dysfunction” in the study by Song, Jeon, Kim, Paick, and Son (2008).

2.7 Relationship aspect of sexual function and postnatal depression

Since the arrival of a new baby to a family brings many changes to the parents' life, childbirth is considered as a potential stressful event. In a metacontent analysis of 59 studies, Kirsten (1999) noted that the couple's relationship was dramatically affected by the newborn, but also their mental health and sexual interactions were influenced.

Interpersonal factors and still being in love have been associated with participants' sexual interest and behaviour (Papaharitou et al., 2008). Both intrapersonal and interpersonal factors including 'partner interaction' and 'societal forces' significantly affected couples' relationships (Huston, 2000). Other studies have shown that women with hypoactive sexual desire disorder were more likely than women with normal desire to have less relationship satisfaction, and more negative feelings for their partner (Dennerstein et al., 2006; Leiblum, Koochaki, Rodenberg, Barton & Rosen, 2006).

In the USA, Moel, Buttner, O'Hara, Stuart, and Gorman (2010) studied the sexual function of treated depressed postpartum women and never-depressed postpartum women and the effects of different contextual factors on the sexual function of postpartum women. The Dyadic Adjustment Scale was used to assess relationship satisfaction and adjustment. The Beck Depression Inventory and Hamilton Rating Scale were also applied to measure the severity of the symptoms of depression. In addition, the Longitudinal Interval Follow-Up Evaluation was used to evaluate psychological functioning of women including their sexual function. The study recruited 20,620 postpartum women by mailing invitation letters and study questionnaires to the participants. Findings reported that depressed women had lower

sexual desire and satisfaction, and more marital dissatisfaction than non-depressed women, which was consistent with the results of an earlier study (Page and Wilhelm, 2007). Moel et al. (2010) also reported that after depressed women had seen a psychologist, there remained a significant difference ($p < 0.0001$) between treated depressed women and non-depressed women regarding their sexual interest and satisfaction.

In addition, Moel et al. (2010) reported that the level of sexual desire and sexual activity of postpartum women steadily increased from early after childbirth to the first year postpartum, which was consistent with the findings of Barrett et al. (2000) and De Judicibus and McCabe (2002). Nevertheless, these findings contrasted with those of Cyranowski et al. (2004) in which depressed and never depressed women demonstrated no difference in sexual desire. The difference could have been due to the use of different questionnaires, as Moel et al. (2010) did not use a validated measure specifically designed to assess elements of sexual function and thus, they did not investigate the various components of sexual function which are included in the FSFI such as sexual desire, arousal, orgasm and pain.

The study of the association between psychological status, relationships and sexual status by Borissova, Kovatcheva, Shinkov, and Vukov (2001) demonstrated that the changes in all aspects of sexual life including sexual thoughts, desire, arousal, orgasm, and dyspareunia, were related to psychosocial factors and lack of a permanent intimate partner.

An Australian study was conducted by Brown and Lumley (2000). They reported that women who had higher levels of sexual problems, relationship difficulties, back pain, tiredness and urinary incontinence were more likely to have postpartum depression.

Factors such as socioeconomic status (Johnson, Cohen, Dohrenwend, Link & Brook, 1999) and cultural issues (Koerner, Prince & Jacobson, 1994) have been reported to contribute to the association of depressive symptoms and relationship satisfaction (Whisman, 2001). Other longitudinal studies (Beach, Katz, Kim & Brody, 2003;

,Pruchno, Wilson-Genderson & Cartwright, 2009) also revealed that couples who had unsatisfactory marital relationships were more likely to demonstrate symptoms of depression. It was proposed by Kendler et al. (1995) that elevated stress within the marital relationship resulted in depressive symptoms.

Another Australian study by Mamun et al. (2009) examined the development of depressive symptoms and quality of couple relationship among 7,223 women after childbirth for a period of 14 years. The State of Anxiety and Depression Inventory was used to measure depressive symptoms of the women and the Spanier Dyadic Adjustment Scale was used to assess the quality of the marital relationship. Results of the study revealed that 9.4% and 12% of women showed depressive symptoms at baseline and after 14 years, respectively. In addition, 10.4% and 13.5% of women reported poor relationship quality at baseline and after 14 years, respectively. At six months and five years postpartum 36.8% and 39.3%, respectively, of the women who had depressive symptoms at the beginning continued to experience depression. Those participants who developed symptoms of depression were more likely to report relationship problems. In addition, women, who were in the relationships that had declined over time, developed depressive symptoms. Although Mamun et al. failed to discuss the effect of other contextual factors in this bidirectional association, their findings were supported by the Australian study by Clavarino et al. (2011) in which women who were in poor-quality relationships were more likely to develop symptoms of depression over a period of 12 years.

2.8 Contextual factors

This section explores contextual factors that may affect sexual function, occurrence of depression and the quality of relationships of women. The eight factors include the following: demographics, mode of delivery, parity, breastfeeding, baby characteristics and child well-being, medical conditions, sexual activity and lesbian relationships. Some of the literature that reported on an individual factor did not include how all three aspects of sexual function, depression and relationships had been impacted. In addition, some of the literature did not include postpartum women specifically.

2.8.1 Demographics

Sexual function, postnatal depression and relationships may be influenced by demographic characteristics that are discussed in the next section. The characteristics include age and education, ethnicity and income.

Age and education

Sexual function of women can be impacted by age and education. Female sexual dysfunction has been reported to be more prevalent among participants who are older (Ishak et al., 2010; 2008) and who have lower levels of education (Shifren et al., 2008). Papaharitou et al. (2008) reported a statistically significant relationship between an increase in age and less frequent sexual intercourse among a group of married adults. Acele and Karaçam (2012) noted that postpartum sexual problems were associated with an increase in age but not with the level of education. In contrast Wentland, Herold, Desmarais and Milhausen (2009) reported that highly sexual women and less sexual women did not differ according to age and education.

Levenson, Carstensen and Gottman (1993) reported that older couples may have less marital conflict and increased relationship satisfaction. In addition, Moel et al. (2010) showed that never-depressed women were more likely than depressed women to be older and Yang, Shen, Ping, Wang and Chien (2011) reported that the prevalence of postpartum depression was lower among older women. In contrast, research by Witt et al. (2011) reported that age was not a risk factor for postpartum depression, but that low educational level (high school or lower) was an indicator of depressive symptoms among postpartum women. In summary, the protective role of age against marital conflicts and symptoms of depression remains inconclusive since there is no consensus in the literature.

Ethnicity

Ethnicity has been statistically significantly associated with desire, arousal and orgasm problems and general sexual function. For example, Shifren et al. (2008) noted that Caucasian and African-American individuals were at greater risk of any

kind of sexual difficulties. There is less certainty, however, over the impact of ethnicity on depressive symptoms. Dunlop, Song, Lyons, Manheim and Chang (2003) reported that African-Americans and Hispanics experience higher rates of depression and was later supported by Ford (2008). However, Ghafoori, Barragan, Tohidian and Palinkas (2012) recruited sixty-five women from urban community health and mental health centres and examined the association between ethnicity and severity of the symptoms of depression. The following tools were used to collect data: The Stressful Life Events Screening Questionnaire; The PTSD Checklist-Civilian version; The Brief Symptom Inventory-18; and the Generalized Anxiety Disorder-7. Results of the study showed no association between ethnicity and symptoms of depression, anxiety and stress.

A study by Walker, Im and Tyler (2012) examined the association between barriers to the postpartum health care, symptoms of depression and ethnicity. Results of their study did not suggest any association between ethnicity and depression in postpartum women.

Income

Papaharitou et al. (2008) proposed that income was associated with sexual interest. A medium or high income was reported to be statistically significantly correlated with an increased risk of arousal disorder in women (Moreira, Glasser, King, Duarte & Gingell, 2008). Nevertheless, the study by Lee et al. (2009) suggested that lower income may have a more substantial impact than higher income on sexual function. These findings were supported by Safarinejad's (2006) results, which indicated that lower income and financial dependency were risk factors for sexual dysfunction.

The level of income may also influence sexual behaviour. In the study by Maynard et al. (2009), all participants who practiced anal sex were from low-income families. However, another study by Misegades, Page-Shafer, Halperin and McFarland (2001) reported that individuals with higher income were more likely to practice anal sex than other kinds of sexual activity. Other research by Baldwin and Baldwin (2000) revealed no association between sexual behaviour and family income. No literature

reported a relationship between family income and sexual behaviour in postpartum women.

Income as an indicator of the health status of people in a society should be carefully regarded while evaluating the mental and physical health of individuals (Dismuke & Egede, 2010; Sun, Buys & Wang, 2012). Sun et al. (2012) reported that lower income negatively affected mental health, and that individuals with lower income were more likely than those with higher income to suffer from depression. Nevertheless, studies evaluating the impact of income on mental health have yielded contrasting results. A Finnish study by Rautio et al. (2012) showed that dissatisfaction with one's financial situation was an indicator of depression in middle-aged and older adults.

Witt et al. (2011) showed that poverty was a significant risk factor for postpartum depressive symptoms. In contrast, income was not identified as a risk factor for postpartum depression in the study by Miyake, Tanaka, Sasaki and Hirota (2011).

In summary, there is a lack of consensus and a postpartum woman's financial status may positively or negatively affect her mental health, sexual function and relationships.

2.8.2 Mode of delivery

Women who had an episiotomy during childbirth were more likely than those without an episiotomy to experience perineal pain (Chang, Chen, Lin, Chao & Lai, 2011). A population-based, cohort study by Thompson et al. (2002) demonstrated that the prevalence of assisted delivery and perineal trauma was higher among primiparous than multiparous women. In addition, primiparous women were more likely than multiparous women to experience lack of sleep, backache (at eighth week), perineal pain and sexual problems (at eighth, sixteenth and twenty-fourth weeks). Also, women who had assisted vaginal delivery experienced a higher level of sexual problems and perineal pain than did women with unassisted vaginal

delivery. This study, however, did not evaluate the effect of relationship satisfaction and postpartum depression on the sexual function of the participants.

Khajehei, Ziyadlou, Safari Rad, Tabatabaee and Kashefi (2009) investigated the effect of the mode of delivery on sexual function of primiparous women during the first year after childbirth. A questionnaire was developed that related to sexual function during and after pregnancy. It was administered to 40 women. Results showed that women who had a caesarean section (CS) were more likely than women who had vaginal delivery with episiotomy (NVD/epi) to resume sexual activity early at the tenth day after childbirth. The prevalence of low libido and vaginal looseness was higher for the NDV/epi group, but the CS group reported more vaginal dryness. Both groups were similar in terms of reported sexual dissatisfaction which was reported by 65% and 60% women in NVD/epi and CS groups (respectively).

In contrast to the study by Thompson, Roberts, Currie and Ellwood (2002) and Khajehei et al. (2009) the research by Rice (1996) showed no association between mode of delivery and quality of sexual life. The latter was supported by the findings of Chivers et al. (2011) who indicated that genital trauma and mode of delivery did not affect sexual function of women.

Two meta-analyses by Borders (2006) and Carter, Frampton and Mulder (2006) demonstrated no association between mode of delivery and symptom of depression after childbirth. Moreover, in a cohort study of 55,814 Norwegian women (Adams, Eberhard-Gran, Sandvik & Eskild, 2012), the mode of delivery was not a risk factor for emotional distress during the first six months after childbirth. Another study by Sword et al. (2011) also revealed no statistically significant correlation between mode of delivery and postpartum depression.

Conflicting results have been reported in other studies, which indicated that mode of delivery was associated with symptoms of postpartum depression. A Chinese prospective cohort study by Xie et al. (2011) administered the Social Support Rating Scale and the Edinburgh Postnatal Depression Scale to 634 women to assess the level of postpartum social support and postnatal depression, respectively. Results of the

study demonstrated that 19% of postpartum women experienced postpartum depression which was associated with mode of delivery. Women who had a caesarean section were more likely to exhibit symptoms of depression after childbirth. The results of the study by Xie et al. (2011) have been corroborated by the results of the study by Yang et al. (2011), which revealed that women who gave birth by normal vaginal delivery or instrumental vaginal delivery were at a lower risk of postpartum depression than women who had a caesarean section.

Conflicting reports by different studies concerning the relationship of the mode of delivery with depressive symptoms of women may be partly due to a biased sample selection as noted by Xie et al. (2011). In addition, face-to-face interviews may have obtained biased responses resulting in contradictory reports (Bjerke et al., 2008). Moreover, the majority of these studies did not investigate the role of relationship satisfaction which is another important contextual factor.

2.8.3 Parity

Parity may be an indicator of sexual function, depression and quality of relationship after childbirth. Barrett et al. (2000) reported that at three and six months postpartum, 83% and 64%, respectively, of primiparous women experienced various types of sexual problems. Stratton, Gordon and Logue (1995) reported that the rate of vaginal tears, episiotomy and assisted vaginal delivery was higher among primiparous women than multiparous ones. According to East, Sherburn, Nagle, Said and Forster (2012) that could explain the higher level of dyspareunia and perineal pain among primiparous women.

An Australian population-based cohort study by Thompson, Roberts, Currie and Ellwood (2002) aimed to evaluate the prevalence of health problems of postpartum women at the eighth, sixteenth and twenty-fourth week after childbirth. A questionnaire was developed to collect data on 12 common problems during postpartum period including: tiredness, sleep, bleeding, backache, headaches, sexual problems, haemorrhoids, sore perineum, mastitis, bowel problems, urinary problems and urinary incontinence. The Edinburgh Postnatal Depression Scale-10 was used to

evaluate symptoms of depression during the postpartum period. The two questionnaires were posted to 1,295 postpartum women with reply paid envelopes. Although the rate of perineal pain was similar between primiparous and multiparous women, a statistically significant relationship was reported between sexual problems and parity at eighth and sixteenth week postpartum with primiparous women having more sexual difficulties. Results of another study by Rice (1996) demonstrated that multiparous women were more sexually active than primiparous/nonparous women. Other research by Botros et al. (2006) reported that although the increase of parity resulted in lower sexual arousal, it did not increase the report of dyspareunia, leakage with intercourse, or orgasm. This was similar to the results of the National Survey of Families and Households in the USA (Rao & Demaris, 1995) in which 9,643 women were interviewed. Primiparous women reported a lower frequency of sexual activity than women without children and multiparous women. The possible explanation for this association was that having only one child at home required more energy, time, and attention, and provided parents with less privacy (Rao & Demaris, 1995).

Other researchers, however, have reported contradictory findings. Morof et al. (2003) reported that both primiparous and multiparous women experienced an equivalent deterioration in their sexual function during the early postpartum period. This finding was corroborated by Shifren et al. (2008) in their USA study. They reported that parity was not statistically significantly associated with any type of sexual difficulties. Moel, Buttner, O'Hara, Stuart and Gorman (2010) noted that the level of desire for sex did not differ between primiparous and multiparous women.

Some of the differences in results could be explained by the use of different assessment tools. In addition, it has not been ascertained if postpartum sexual dysfunction is mostly affected by childbirth per se, or if it is associated with other variables such as postnatal depression and the quality of a couple's relationship, as the majority of studies failed to simultaneously investigate these three dimensions of postpartum women.

Furthermore, some studies demonstrated no association between parity and depression after childbirth (Ji et al., 2011; Watkins, Meltzer-Brody, Zolnoun &

Stuebe, 2011; Witt et al., 2011). Other research, however, suggested that parity was a contextual factor for postpartum depression, and that multiparous women were more likely than primiparous ones to show symptoms of depression after delivery (Moel et al., 2010). It has also been reported that the resolution of depression from the eighth to the twenty-fourth week postpartum was more noticeable in multiparous women than primiparous ones (Thompson et al., 2002).

An association between parity and postpartum mental health problems has been noted. Kumar and Robson (1984) reported that multiparous women had more obstetrical complications and postpartum health problems, and this subsequently influenced their vulnerability to postpartum depression. The challenge has been reported more frequently in multiparous women since they care for more than one child. Although research has reported that in families with more than one child, children can play with each other and older children supervise the younger ones providing the parents with more time (Rao & Demaris, 1995), other studies have reported that increased responsibilities, tension, tiredness and lack of sleep were factors that resulted in the higher risk of multiparous women developing postpartum depression (Corwin, Brownstead, Barton, Heckard & Morin, 2005; Dennis & Ross, 2005; Kurth, 2010).

2.8.4 Breastfeeding

Similar to other contextual factors, the effect of breastfeeding on the sexual function and potential for developing depression in postpartum women remains inconclusive. De Judicibus and McCabe (2002) indicated that, compared to non-breastfeeding women, those who breastfed their babies were less likely to restart sexual intercourse during the first 12 months after childbirth. The level of sexual desire in non-breastfeeding women after the first year postpartum was higher than that of breastfeeding women. This finding was corroborated by another study that indicated breastfeeding had a negative effect on the sexual function of women during the postpartum period (Haugen, Schmutzer & Wenzel, 2004). Connolly et al. (2005) showed that breastfeeding was correlated with dyspareunia at 12 weeks after childbirth. Khajehie et al. (2009) reported that women who breastfed their babies

were less likely to resume intercourse before 10-15 weeks after childbirth and almost half of them suffered dyspareunia.

In contrast, other studies demonstrated no relationship between recommencement of sexual interactions and breastfeeding (Alder & Bancroft, 1988; Connolly et al., 2005; K. Robson, Brant & Kumar, 1981). Furthermore, the level of desire for sex did not differ between breastfeeding and non-breastfeeding women in the study by Moel et al. (2010). The differences in reporting may be due to the retrospective study design (Moel et al., 2010) or the use of different definitions of sexual dysfunction (Byrd, Hyde, DeLamater & Plant, 1998; Signorello, Harlow, Chekos & Repke, 2001). Time-related differences could also have contributed to the inconsistency as results of studies could change during different time periods.

Leeman and Rogers (2012) found that breastfeeding, which may result in a mother's fatigue and changes in her sexual desire, also affected a couple's relationship as breastfeeding was a time-consuming activity and it interfered with intimate emotional contacts between partners.

It was also suggested by Ip, Chung, Raman, Trikalinos and Lau (2009) and Watkins et al. (2011) that breastfeeding protected the mother from postpartum depression. Women who did not breastfeed or were recommended not to breastfeed for medical reasons have been shown to be at greater risk of postpartum depression (Ip, Chung, Raman, Trikalinos & Lau, 2009; Watkins et al., 2011). Dennis and McQueen (2007) reported that the association between failure to breastfeed and depression seemed to be bidirectional as depressed women were more likely to postpone breastfeeding or discontinue lactation early after childbirth.

2.8.5 Baby characteristics and child well-being

Baby temperament is one of various factors that may contribute to the development of depressive symptoms in women during the postpartum period. An association between the characteristics of the baby and symptoms of depression is evident in the literature.

In a cross-sectional study, Akbar Zadeh, Khajehei, Sharif and Hadzic (2012) recruited 400 postpartum women and administered two validated questionnaires, the Beck Depression Inventory and Spielberger Standard Test, to evaluate factors affecting postnatal depression and anxiety of women, respectively. Results demonstrated that mothers who gave birth to babies with abnormal birth weight (less than 2500 grams or more than 3500 grams) were more likely to experience postpartum depression compared to mothers of babies with normal birth weight (2500-3500 grams). The association between low birth weight and postpartum depression has also been documented in other studies (Rush, 2000; Veddovi, Gibson, Kenny, Bowen & Starte, 2004). Research has shown that the relationship between low birth weight and maternal depression may be reciprocal. It has been reported that mothers with a prior history of depression were more likely to deliver babies with lower-than-normal birth weight (Patel & Prince, 2006; Rahman, Iqbal, Bunn, Lovel & Harrington, 2004). On the other hand, the birth of a baby with lower-than-normal weight negatively affected the psychological status of mother and significantly contributed to her postpartum depression (O'Brien, Asay & McCluskey-fawcett, 1999).

Research by Akbar Zadeh, Khajehei, Sharif and Hadzic (2012) in Iran also reported that women who gave birth to baby girls were more likely than mothers of baby boys to experience postpartum depression. This supported the results of a study conducted in India by Patel, Rodrigues and DeSouza (2002) in which an association was found between the gender of the baby and depressive symptoms indicating that mothers of baby girls were at higher risk of postpartum depression. In France, De Tychey et al. (2008) found that having a baby boy was a risk factor for postpartum depression. The different results, in addition to that of a Swedish study by Sylvén et al. (2011) in which no significant association was found between baby gender and postpartum depression, suggested that the association between baby gender and postpartum depression could be mainly due to cultural issues and family expectations rather than a statistical relationship. Lagerberg and Magnusson (2012) corroborated the assumption, demonstrating that Swedish-born mothers of baby boys were more likely than Swedish-born mothers of baby girls to experience postpartum depression. On the other hand, Middle East-born mothers of baby boys were less likely than Middle

East-born mothers of baby girls to demonstrate depressive symptoms. Although the difference between groups was not statistically significant in the study by Lagerberg and Magnusson (2012), these findings suggest an association between baby gender and a mother's postpartum depression may be due to cultural factors.

It has also been reported that mothers whose babies had medical problems were more likely than mothers with healthy babies to experience depressive symptoms (Akbar Zadeh et al., 2012). Postpartum coital activity and sexual desire or arousal have been shown to be irrelevant to birth weight and gender of the baby (Grudzinkas & Atkinson, 1984). Their study, however, was not supported by a later study indicating that mothers of baby boys were less sensitive to erotic touch than mothers of baby girls (Werneck, 1996).

2.8.6 Medical conditions

Various medical problems appear to affect sexual function of women. As it was beyond the scope of the present study to review all the medical conditions that could affect women's sexual function the most prevalent ones are discussed here: urinary tract problems, uterus diseases, chronic diseases, inflammatory diseases and neurological conditions.

Considering the close anatomical relationship between the urinary tract system and genital organs, some problems of the urinary tract system may affect the genital organs and sexual function. Voiding problems have been reported to be associated with sexual dysfunction by S. Song et al. (2008) and painful bladder syndrome has also triggered different degrees of sexual dysfunction and dyspareunia as reported by Bogart, Suttorp, Elliott, Clemens and Berry (2011) and Warren et al. (2011).

The prevalence of urinary incontinence after childbirth was reported to be 6.7% (Valeton & do Amaral, 2011). Its occurrence has been shown to be independent of mode of delivery and newborn weight, but was associated with multiparity (Valeton & do Amaral, 2011). Research has also shown that almost 50% of women with urinary tract problems and urinary incontinence experience some degree of sexual

dysfunction (Salonia et al., 2004), and that the sexual life of the 50% of women with urinary incontinence was impaired due to this problem (Nilsson, Lalos, Lindkvist & Lalos, 2011). Serati et al. (2008) reported that 61.9% of women suffered urinary incontinence and experienced leakage of urine during penetration. They also showed that 37.1% of them had urine leakage during orgasm that interfered with their sexual function and sexual life. Both urinary incontinence and lower urinary tract symptoms were related to sexual problems such as hypoactive sexual desire disorder, sexual arousal disorder, orgasmic problems, dyspareunia, and noncoital genital pain (Köhler & McVary, 2009; Salonia et al., 2004).

Uterine diseases may be another risk factor for sexual function problems of women. Endometriosis has been correlated with sexual dissatisfaction (Tripoli et al., 2011) and the quality of sexual function of women was also affected by uterine fibroids (Voogt, Fonteijn, Lohle & Boekkooi, 2009). Women who had genitourinary cancer were more likely to suffer sexual dysfunction due to the physical trauma induced by therapy procedures as well as the negative psychological and emotional influences of the cancer. Any kind of pelvic surgery to treat pelvic cancer could damage the neural plexus of the pelvis and bring about sexual dysfunction (Banerjee, 1999; Mannaerts et al., 2001). Genitourinary cancer also resulted in less frequent intercourse, decreased sexual desire, dyspareunia, vaginal dryness, and anorgasmia (Chen, Clark & Talcott, 2009; Fitzpatrick et al., 2011; Ofman, 1995). Other chronic diseases, such as breast cancer (Herbenick, Reece, Hollub, Satinsky & Dodge, 2008), diabetes (Fatemi & Taghavi, 2009), coronary artery disease (Kaya, Yilmaz, Nurkalem, Ilktac & Karaman, 2006), and heart disease (Moreira et al., 2008; Schwarz et al., 2007; Webbera et al., 2011) have played an important role in the occurrence of sexual dysfunction.

Sexual function could also be influenced by inflammatory diseases such as rheumatoid arthritis and ankylosing spondylitis as they induce joint pain and restrict body movement (Akkuş, Nakas & Kalyoncu, 2010). An American population-based study by Shifren et al. (2008) reported that thyroid problems, arthritis, and inflammatory or irritable bowel disease were related to sexual desire disorder, arousal difficulties and orgasmic problems.

In addition, multiple sclerosis (MS) could affect the sexual function of some women and induce unpleasant sexual experience due to the decrease of vaginal sensation, less vaginal lubrication, dyspareunia and sexual pain disorders (DasGupta & Fowler, 2002, 2003). A correlation between sexual dysfunction of MS patients and age, lower level of education, sphincter and bladder dysfunction, depression, anxiety and lower quality of life has been demonstrated in studies by DasGupta and Fowler (2003), Folstein, Folstein and McHugh (1975), Kurtzke (1983) and Nortvedt et al. (2001).

Moreover, neurological conditions have also been shown to impact sexual function of women (Frohman, 2002; Mattson, Petrie, Srivastava & McDermott, 1995; Zorzon et al., 1999). For example, spinal cord injury (SCI) has been reported to be responsible for hypoactive sexual desire disorder, less frequent masturbation, and less ability to achieve vaginal lubrication and orgasm (Sipski & Alexander, 1993; Whipple & Komisaruk, 1997). Women suffering from SCI reported enjoyment of kissing, hugging and touching more than other types of sexual activities (Charlifue, Gerhart, Menter, Whiteneck & Manley, 1992). It has been noted that the type and severity of sexual problem depended on the level of injury in the spinal cord (Benevento & Sipski, 2002).

Urinary incontinence is a medical condition that has been associated with symptoms of postpartum depression. The study by Chien (2011) recruited 166 Thai postpartum women and showed that the prevalence of urinary incontinence at one month and one year after childbirth was 12.0% and 11.4%, respectively, which was consistent with the prevalence of postpartum depression at one month and the first year after delivery (27.7% and 23.5%, respectively). They also reported a statistically significant association between urinary incontinence and symptoms of depression.

The study by Yang et al. (2011) showed a statistically significant association between postpartum depression and various antepartum problems including heart disease, anaemia, syphilis, asthma, thyroid diseases and epilepsy. Other research by Witt et al. (2011) also found a statistically significant relationship between postpartum depression and chronic medical conditions such as diabetes, chronic bronchitis, high cholesterol, primary hypertensive disease, asthma and renal disease.

These results highlight the necessity of detailed and precise investigations when studying postpartum depression and sexual dysfunction, as sexual or mental health problems may be due to co-existing medical conditions. The removal of underlying medical conditions could result in the concurrent subsidence of the symptoms of depression or sexual dysfunction.

2.8.7 Sexual Activity: Penile-vaginal intercourse, masturbation, anal sex and oral sex

The literature suggests that the practice of different types of sexual activity may vary among women during the first year after childbirth. The literature shows that penile-vaginal intercourse, masturbation, anal sex, and oral sex may influence sexual life, demonstration of depression and quality of relationships in different ways.

Penile-vaginal intercourse

Philippsohn and Hartman (2009) noted that the level of sexual satisfaction was higher among women who had penile-vaginal intercourse than those who practiced other types of sexual activity. It was also shown that orgasm induced by penile-vaginal intercourse and frequency of intercourse were the two factors that affected women's general sexual satisfaction. Philippsohn and Hartman (2009) also found that acquiring sexual satisfaction through penile-vaginal intercourse resulted in two main outcomes: an increase in intimacy and a positive physical and emotional experience. Similarly, Santtila et al. (2008) noted that individuals who had a higher desire for kissing and petting and more frequent penile-vaginal intercourse were more satisfied with their relationships.

When Brody and Costa (2009) and Costa and Brody (2007) examined the association between penile-vaginal intercourse and quality of relationships in two studies with different populations of women the results were the same. In the 2007 study, they recruited Portuguese women and, in 2009, Swedish women. In the 2007 study, Costa and Brody investigated the association between women's quality of relationship and frequency of penile-vaginal intercourse that followed with orgasm. They used the Perceived Relationship Quality Components Inventory to assess the quality of

relationship. Analysis of the results revealed a positive linear correlation between the frequency of penile-vaginal intercourse, penile-vaginal orgasm and better quality relationship.

In the 2009 study, Brody and Costa explored the association between sexual satisfaction, general life satisfaction and mental well-being with the frequency of penile–vaginal intercourse and masturbation. Women who had more frequent penile-vaginal intercourse, reported higher sexual and general life satisfaction and were less likely to develop symptoms of depression. Brody and Costa's (2009) findings of a relationship between frequent penile-vaginal intercourse and symptoms of depression supported an earlier study (Beck, 1967), which indicated that women with mild depression experienced an increase in sexual desire and that a partial to complete loss of sexual desire was associated with moderate to severe depression.

It has been further suggested that people who engaged in partnered penile–vaginal intercourse had higher levels of psychological health, and lower levels of stress, than people who practiced other types of sexual activity (Brody, 2006; Heinrichs, Baumgartner, Kirschbaum & Ehlert, 2003; Komisaruk & Whipple, 1998). Other studies, however, reported different results indicating no association between the type of sexual activity and sexual satisfaction, relationship satisfaction and depression (Chivers, Pittini, Grigoriadis, Villegas & Ross, 2011; Song, Jeon, Kim, Paick & Son, 2008).

No literature was located that reported an association between penile-vaginal intercourse and sexual satisfaction, relationship satisfaction and depression among postpartum women. Although Hipp, Kane Low, and Anders (2012) found that 85% of postpartum women practiced penile-vaginal intercourse three months after childbirth, they did not report whether an association existed between penile-vaginal intercourse and sexual satisfaction, relationship satisfaction and depression in postpartum women.

Masturbation

Previously believed to cause serious harm to both mind and body (Frank, 2010; Laqueur, 1990; Wood & Ruddock, 1918), recent research has found that masturbation can help people release sexual tension, learn about their sexual response (King & Ussher, 2012) and achieve better sleep (S. Song et al., 2008). One German study (Philippsohn and Hartman, 2009) reported that median frequency for masturbation was less than once per month. An Australian study (Horne and Zimmer-Gembeck, 2005) noted that women who masturbated and reached orgasm reported higher levels of sexual pleasure and were more expressive in their intimate relationships, compared to those who had never experienced a non-coital orgasm. A Korean study by Song et al. (2008) found there was less sexual dissatisfaction and better sexual function, including lubrication and orgasm, among masturbating women. Another study in the United Kingdom, found that women who masturbated reported it was a positive and fulfilling experience (Hogarth and Ingham, 2009).

Other studies, however, have contrasting findings. When Costa and Brody (2007) found that women who masturbated reported they were less likely to experience orgasm during penile-vaginal intercourse, they concluded that masturbation impeded sexual activity with a partner, hindered women from experiencing orgasm during penile-vaginal intercourse, and interfered with the partner relationship. Further, Santtila et al. (2008) noted that more frequent masturbation and sexual fantasies were statistically significantly associated with relationship dissatisfaction. In Brody and Costa's 2009 study, there was an inverse association between the frequency of masturbation and all satisfaction measures. Couples with lower relationship satisfaction were more likely than those who were satisfied to practice masturbation, and this association was 'bi-directional' (Brody and Weiss, 2011; Santtila et al., 2008). Although Costa and Brody (2007) found that all participants were in an ongoing relationship with a sexual partner and that 46.7% cohabited with their partners, they did not explain as to whether women who masturbated were those who lived with their partners or those who lived apart.

Frohlich et al. (2002) evaluated depressive symptoms and the sexual life of college women with the Beck Depression Inventory and Brief Index of Sexual Functioning

for Women. The researchers found that women who suffered depressive symptoms had more desire to engage in masturbation and were more likely to masturbate, whereas depressed women were less satisfied with their sexual life and reported more sexual problems such as less vaginal lubrication, less orgasm and more sexual pain. These results were later supported by Cyranowski et al. (2004) in which women with recurring major depressive disorders were more likely than non-depressed women to engage in masturbation. Although Frohlich et al. (2002) found that an increased desire for masturbation was associated with mild depression their results contradicted an earlier study (Kennedy, Dickens, Eisfeld & Bagby, 1999) which indicated that depressed women had less sexual desire to masturbate. A recent study by Chivers et al. (2011) demonstrated that depressed and non-depressed women were not different in terms of frequency and quality of masturbation.

There was no research that could be located, which reported whether an association exists between masturbation and sexual satisfaction, relationship satisfaction and depression in postpartum women. Thus, there is a need for further investigation about this association.

Anal sex

Santtila et al. (2008) noted that more frequent anal intercourse was statistically significantly associated with relationship dissatisfaction. Maynard, Carballo-Diequez, Ventuneac, Exner and Mayer (2009) reported various stimuli motivated women to practice a particular type of sex or to refrain from specific sexual behaviours. The researchers noted that although the male partner was the initiator in the majority of anal sex activities, women consented for the following reasons: a) women felt more powerful with more control over other aspects of the relationship; b) they felt more desirable and attractive; c) it was something different even though there was pain during or after anal intercourse; d) it gave pleasure to the male partner; g) it increased and revealed 'intimacy', 'commitment', 'openness', and 'closeness' with their partners.

In addition, researchers (Maynard et al., 2009) reported that women had noted they enjoyed anal sex and that they identified anal sex as an exceptional sexual behaviour relative to other types of sexual activity. Although the study was notable in terms of why and how anal intercourse was practiced among heterosexual women, the results cannot be generalised due to some limitations: the small size of the study population (28 women) and face-to-face interviews which could have resulted in biased responses (Ghanem, Hutton, Zenilman, Zimba & Erbeling, 2005; Lindstrom et al., 2010).

No research was located that studied an association between anal intercourse and sexual satisfaction, relationship satisfaction and depression among postpartum women. Thus, there is a need for further investigation about this association.

Oral sex

Cornell and Halpern-Felsher (2006) reported the following as the reasons why young women (13-16 years old) engaged in oral sex: 'improving a relationship', 'peer pressure' and 'coercion from a partner'. In the study by Leichter, Chandra, Liddon, Fenton and Aral (2007), 75% of women aged 15-44 reported that they had practiced oral sex during the past six months, and that oral sex was not associated with marital

or cohabitation status, but to a higher number of lifetime partners. Also, Armstrong, Hamilton and England (2010) indicated that the practice of oral sex was more likely to be reciprocal among young women (14-19 years old).

Heiman et al. (2011) indicated that women who engaged in oral sex were less likely to experience hypoactive sexual desire disorder than those who did not practice oral sex. This finding was supported by results of a later study by Backstrom, Armstrong and Puentes (2012) indicating that women who engaged in oral sex were more likely to experience orgasm, compared with those who did not.

Hipp, Low and Anders (2012) reported that 65% of postpartum women engaged in oral sex three months after childbirth, earlier than other types of sexual activity. However, they made no comment on whether an association existed between oral sex and sexual satisfaction, relationship satisfaction and depression in postpartum women.

There has been a lack of consensus in the literature suggesting a need for further investigation about the effect of the type of sexual activity on sexual satisfaction, mental health and quality of relationships in postpartum women.

2.8.8 Same-sex relationships

Research has suggested that lesbian women could differ from heterosexual women with regard to the quality of relationships, psychological status and sexual function. However, similar to other contextual factors, the effect of sexual orientation on the sexual function and potential for developing depression in postpartum women remains controversial and inconclusive.

Quality of relationships

Some people may believe that commitment in homosexual relationships is not as strong as heterosexual commitment (Kapeleris, 2010; Vincent, Peterson & Parrott, 2009). However, it has been reported that gender issues have been addressed within

homosexual relationships as no one is assigned gender-specific roles, and the distribution of chores, household labour and responsibilities has been negotiated between partners in same-sex relationships perhaps resulting in less conflict (Patterson, 2000). Results of the study by Kurdek (2004) demonstrated that the levels of autonomy and equality in relationships were higher among lesbian couples compared to heterosexual couples, indicating that lesbian couples had more positive relationships than did heterosexuals. Moreover, lesbian couples were more likely than heterosexual couples to resolve conflicts in their relationship indicating more positive communication in lesbian relationships.

In contrast, Andersson, Noack, Seierstad and Weedon-Fekjær (2006) found that lesbians were more likely than married and cohabiting heterosexual couples to be dissatisfied and dissolve their relationships. Simons and O'Connell (2003) reported that the factors that impacted relationship dissolution included society, religion, legal barriers to dissolve the relationship and children.

Huston (2000) noted that couple relationship satisfaction was influenced by the level of social and family support received. Furthermore, Kapeleris (2010) showed that heterosexual couples were supported more than homosexuals in some societies. Although the main source of support for homosexual couples was their friends but not families, homosexual couples reported being more satisfied than heterosexual couples with their relationships (Kurdek, 2004).

Psychological status of lesbian women

In order to evaluate the association between sexual orientation, mental health and physical well-being in women, Sandford, Bakker, Schellevis and Vanwesenbeeck (2006) surveyed 12699 participants of all ages in a population-based study in Denmark. Fewer homosexuals than heterosexuals were living with a steady partner and homosexuals had higher levels of education than heterosexuals. It was also reported that homosexuals had higher acute mental health problems such as depression than heterosexuals did, and the scores for general mental health in homosexuals were lower than those of heterosexuals.

Cochran, Sullivan and Mays (2003) analysed data from a United States national survey to evaluate the relationship between sexual orientation and psychological problems. There were 3032 women aged 22-74 years who participated. Results of the study demonstrated that the rate of major depression was higher among lesbian women than their heterosexual counterparts. As well, lesbian women were more likely than heterosexual women to seek treatment for their depression and visited mental health providers, met with general physicians and attended self-help groups. Although the results of this research have been corroborated by other studies (Fredriksen-Goldsen, Kim & Barkan, 2012; Sinclair, Bauman, Poteat, Koenig & Russell, 2012), the results could not be generalised to a larger population due to the small number of homosexuals as only 37 respondents or 2.2% of the study population were lesbians. Moreover, the women were not queried whether they were in a relationship, and satisfied and happy, even though relationship satisfaction has been shown to be an indicator of mental health status (Mamun et al., 2009).

King et al. (2003) used snowball sampling to recruit 430 (42.2%) homosexual and 588 (57.8%) heterosexual women and assessed their psychological status and quality of life. Results demonstrated that lesbian women had more psychological distress than their heterosexual counterparts. In addition, homosexual women were more likely than heterosexual ones to live alone, consult with mental health professionals and have suicidal thoughts. The results of this study supported the findings of previous research by D'augelli (2002) regarding the higher rate of mental health problems, such as depression, among women in same-sex relationships, and also the higher risk of psychiatric disorders such as suicidal attempts and multiple disorders among homosexuals reported by Fergusson, Horwood and Beautrais (1999). However, any possible association between living alone and psychological distress of lesbians was not discussed in the study by King et al. (2003).

Using multistage, stratified random sampling, Sandford, Graaf, Bijl and Schnabel (2001) interviewed 7076 households in the Netherlands. Results of the study demonstrated that the prevalence of general mood disorders and major depressive symptoms was higher among lesbians than their heterosexual counterparts. A limitation of this study could be the method of data gathering. Sandford et al.

interviewed participants in order to collect data and it is possible that biased responses could have been obtained.

Postpartum depression of women in same-sex relationships has been investigated and relative risks for depressive symptoms after childbirth have been examined. Research has suggested that having a history of depression may confer an equal risk of postpartum depression in lesbian women as in their heterosexual counterparts (Baetens, Camus & Devroey, 2002; Ross, 2005).

Sexual function of lesbian women

Two studies have reported no difference between women in same-sex relationships and women in heterosexual relationships regarding their sexual function (Laumann et al., 1999; Matthews, Hughes & Tartaro, 2006). Douglass and Douglass (1997) and Loulan (1984) reported the frequency of orgasm to be higher among lesbian couples with 83-95% experiencing orgasm in almost all of their sexual activity, and 46% having multiple orgasms in each of their sexual encounters. Yet regular orgasm was experienced by only 26-29% of heterosexual women during each sexual intercourse in the study by Laumann, Gagnon, Michaels and Michaels (1994). Nevertheless, the results of a previous study by Sprecher (2002) suggested that frequency of sexual activity was not an indicator of sexual satisfaction and other factors, such as relationship satisfaction and affection for the partner significantly contributed to women's sexual function.

Nichols (2004) has shown that relative to heterosexual women, lesbian women had less arousal disorder, orgasmic problems and sexual pain. Similarly, Breyer et al. (2010) found that heterosexual women were at greater risk of sexual dysfunction compared to their lesbian counterparts (51% vs. 29%, respectively). Contradictory results reported in a recent study by Burri et al. (2012) indicated that, in spite of engaging in more frequent sexual activities, non-heterosexual women suffered more sexual desire disorder, sexual distress, and sexual dissatisfaction.

A review of the literature suggested that women who were in a same sex relationship could be at greater risk of postpartum depression and sexual dysfunction. Nevertheless, the lack of understanding of the complexity of the lesbian experience after childbirth reveals an uncertainty about the association between sexual function, parity, postpartum depression and relationship satisfaction of women in same-sex relationships.

2.9 Summary: Research issues

Some studies have provided information about the relationship between sexual function and depression in postpartum women as well as affecting contextual factors. They indicated that sexual function of postpartum women can be affected by postpartum depression and relationship dissatisfaction. In addition, they reported that factors such as demographics, mode of delivery, parity, breastfeeding, baby characteristics and child well-being, medical conditions, different types of sexual activity and same-sex relationship can influence sexual function, depression and the quality of relationship of postpartum women.

However, there were some areas that were missing evidence and some contrasting results in existing research. The conflicting data and inconsistency could be due to the small number of women in epidemiological studies. This could also be a result of the method of data collection. In a few of the studies previously discussed, the researchers interviewed participants in order to collect information. It is assumed that participants who are interviewed face-to-face may be less likely to respond honestly, especially if they are asked about topics such as sexuality, marital difficulties or psychological factors such as depression, which they regard as personal or sensitive. Thus, the most appropriate method of collecting data needs to be used while collecting sensitive information.

The present study was specifically designed to be comprehensive and evaluate the association between sexual function, postnatal depression and relationship satisfaction during the postpartum period. The present study was also designed to address eight relevant contextual factors including demographics, mode of delivery, parity, breastfeeding, baby characteristics and child well-being, medical conditions, different types of sexual activity (penile-vaginal intercourse, masturbation, anal sex and oral sex) and same-sex relationships, which may affect sexual function of women after childbirth. In addition, the limitations of the existing studies, such as face-to face interview, were identified and considered in the design of the present study.

Chapter 3: Research Method

This cross-sectional study used survey methodology. Postpartum women who had given birth in the previous 0-12 months were invited to participate in an online survey. Relationships between sexual function, depression, parity and relationship satisfaction were explored.

3.1 Survey methodology

Survey methodology is used:

to answer questions that have been raised, to solve problems that have been posed or observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyse trends across time, and generally to describe what exists, in what amount, and in what context (Isaac & Michael, 1997, p. 136).

Survey methodology has been widely used by health professionals to study a large sample to acquire information (Groves et al., 2009; McIntyre, 1999). In this study, survey methodology consisted of an online questionnaire that contained close-ended questions (quantitative) and open-ended questions (qualitative).

3.2 Data gathering: Online questionnaire

Aslan and Fynes (2008) point out that data gathering in studies on sexuality are usually structured interviews and self-reported questionnaires. The authors argue that although structured interviews may decrease the probability and risk of misunderstanding of technical terms, self-reported questionnaires provide a more private environment and decrease the risk of bias in responses, as the participants are not embarrassed by revealing sensitive information while responding to a questionnaire.

Using questionnaires has been one of the most common methods of obtaining information (Clark et al., 2009; Gillham, 2004; Healy et al., 2011). Their construction is relatively easy, they are multifaceted and adjustable, and they are able to obtain considerable amounts of information that can be readily analysed (Amari, Vandebeek, Montgomery, Skarsgard & Ansermino, 2010; Clark et al., 2009). Standardised validated questionnaires have been widely used in the studies of female sexual function (Jones, 2002).

Questionnaires can be administered in different ways, one of which is the online approach. Online questionnaires are a popular method of data collection in health science studies (Atherton, Oakeshott, Aghaizu, Hay & Kerry, 2010; Ward, Abisi & Braithwaite, 2013) and shown to be one of the most reliable methods of data collection when collecting sensitive information (Atherton, Oakeshott, Aghaizu, Hay & Kerry, 2010; Chung, Des Roches, Meunier & Eavey, 2005).

Wright (2005) investigated advantages and disadvantages of online survey and reported that they have some disadvantages. One of the disadvantages is that participants may misunderstand the aim of the questions as there is a lack of a trained interviewer in an online survey. Technical problems have also been reported as another disadvantage of an online survey that may influence the user's cooperation. Notwithstanding, the advantages of online survey have been reported to outweigh its disadvantages. One of the advantages is that the internet can provide access to people who are difficult to interview face-to-face or to reach. It is also a time-saving method to collect data from a large population and provides access to people with various demographic characteristics. Moreover, an internet-based questionnaire is cost-effective eliminating the need for paper and other accompanying costs, such as posting, printing, data entry and staff (Wright, 2005).

K. Howard (2010) noted that in an online study, the data analysis could start as soon as the study ends, as the gathered data was automatically directed to a database and no extra time was needed to enter raw data. Another benefit of online questionnaires reported by O'Neill (2004) was that online questionnaires have higher response rates than paper-based questionnaires.

Kaestle, Halpern, Miller and Ford (2005) supported the use of computer-assisted self-interviewing technology as useful for research on sensitive topics such as sexuality. The risk of accidental disclosure that could occur in face-to-face interviews was reduced and privacy was increased, possibly improving response rates.

Russell and Joyner (2001) benefitted from using an online questionnaire in their sexuality study that investigated the link between sexual orientation and suicidal thoughts and behaviours. Mullens, Young, Dunne and Norton (2010) were able to collect sensitive data using an online questionnaire for their Australian study that found the risk of using cannabis and engaging in high risk sexual activities was high among homosexuals, supporting earlier research by Z. Hyde, Comfort, McManus, Brown and Howat (2009). Furthermore, Hampshire and Di Nicola (2011) reported that the use of the online questionnaire was effective for their investigation into another sensitive topic, family relationships.

3.3 List of variables

Based on the objectives of this study dependant and independent variables, were defined.

3.3.1 Dependent variables

Objectives one, two and three: Desire, arousal, lubrication, orgasm, satisfaction, pain, FSFI total score, depression and relationship satisfaction were the dependent variables for these objectives.

Objective four: Desire, arousal, lubrication, orgasm, satisfaction, pain, FSFI total score were the dependent variable for this objective.

3.3.2 Independent variables

Objectives one, two and three: Parity was the independent variable for these objectives.

Objective four: Demographics, obstetrics and gynaecological history, baby's characteristics, medical history, sexual life, relationship satisfaction, parity and depression were the independent variables for this objective.

3.4 Participants

Postpartum women were invited to participate in this study. The inclusion criteria were: a) between 16 and 40 years old; b) given birth to live baby at 37th week or later of pregnancy; c) given birth 0-12 months ago; d) having a current regular sexual partner; e) not using any kinds of antipsychotic medicines; f) not currently being pregnant.

Responses from women were excluded from the study if they had: a) been clinically diagnosed with any kind of psychiatric illnesses, such as obsessive compulsive disorders, anorexia nervosa, post-traumatic stress disorder and phobia; b) been of Aboriginal or Torres Strait Islander.

The inclusion and exclusion criteria for this study were based on the objectives of the study and the literature review. In order to address the objectives and obtain information regarding the inclusion and exclusion criteria, questions were placed at the beginning of the questionnaire (Appendix C).

The National Health and Medical Research Council (NHMRC) Guidelines (2007) affirm that "consent should be a voluntary choice" (p. 19), and because the legal age of consent in Australia is 16 years (National Child Protection Clearinghouse, 2010), women/females who were 16 years of age or older were invited to voluntarily participate in this study. Women who were older than 40 years were excluded from the study since they were more likely to experience premenopausal and

perimenopausal changes. These changes have been shown to affect sexual life and mental health, specifically evidence of depression in women over 40 years of age (Avis et al., 2009; Hess et al., 2009; 2011).

Furthermore, when inviting Aboriginal/Torres Strait Islanders to participate in research, there are additional concerns. According to the National Statement on Ethical Conduct in Human Research (National Health and Medical Research Council, 2007), “researchers should address relevant issues of research design, ethics, culture and language” (p. 69) if they aim to study Aboriginal and Torres Strait Islander individuals. Therefore, women who identified that they belonged to this group were excluded from the study.

The study website was launched May 15, 2012 with 489 women completing the survey as of August 8, 2012. Data considered for inclusion and exclusion were derived from responses to the questions seeking information on women’s age, country/state, ethnicity, relationship status, being currently pregnant, pre/term birth, age of the baby, current use of antidepressants and presence of a mental health condition. A total of 164 women were excluded for the following reasons: 67 respondents lived in other countries; 12 were of Aboriginal or Torres Strait Islander background; 8 women were not in a relationship; 5 were pregnant; 8 had given birth before the 37th week of pregnancy; 15 reported using antipsychotic medicines; 13 suffered from mental health problems such as obsessive compulsive disorder, anxiety, phobia and posttraumatic stress disorder; and 36 did not complete all of the quantitative questions. Therefore, a total of 325 women were included in the data analysis.

3.5 Sample size

Following the literature review, and considering the prevalence of sexual problems in the population of postpartum women in Australia (Brown & Lumley, 1998, 2000), the formula below was used to estimate the number of participants required for the present study:

$$n = \frac{Z^2 P(1-P)}{E^2}$$

Z: 1.96

E: error (precising) = 0.05

P: prevalence of sexual problems = 26% or 0.26 (Brown & Lumley, 1998, 2000)

According to the formula, 295 postpartum women who met the inclusion criteria were required to participate in the study.

3.6 Instruments

Guided by the literature review, a multi-section questionnaire consisting of five sections was designed. The online questionnaire used in the present study was available on SurveyMonkey, an online survey design website.

Section one contained 37 questions requesting information about demographics (6 questions), obstetrics and gynaecological history (10), baby's characteristics (6), medical history (9) and sexual life (6). The designed questionnaire was reviewed for face and content validity by 15 researchers who had previously used online questionnaires.

For section two the Female Sexual Function Index (FSFI) was used to evaluate sexual function of postpartum women. The FSFI has been widely used in studies. Its validity has been documented and its reliability reported to be from 0.76 to 0.93 (Burri, Cherkas & Spector, 2010; Chang, et al., 2010; Rivalta, Sighinolfi, Micali, De Stefani & Bianchi, 2010; Rosen et al., 2000; Ter Kuile, Brauer & Laan, 2006). The FSFI contains 19 multiple-choice questions that capture information about sexual function in the past four weeks and evaluate six main domains of female sexual function including desire, arousal, lubrication, orgasm, satisfaction, and pain (Rosen, et al., 2000).

Section three assessed symptoms of depression in participants with the use of the Patient Health Questionnaire (PHQ-8). The original questionnaire consisted of 9 questions (PHQ-9). The questions were developed based on the criteria of depression in the Diagnostic and Statistical Manual of Mental Disorder, Third Revision (DSM-III) and have been updated according to the Diagnostic and Statistical Manual of Mental Disorder, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994). This questionnaire is a validated tool that has been used to investigate depression in many studies. Its reliability has been reported to be from 0.78 to 0.89 (Kroenke, Spitzer & Williams, 2001; Monahan et al., 2009). The instrument has been reported to be more accurate, reliable (Weobong et al., 2009) and specific (Gjerdingen et al., 2009) than other tools to identify postpartum depression. The PHQ-9 contains nine questions asking about different symptoms of depression within the past two weeks (Gjerdingen et al., 2009). The ninth question in the PHQ-9 asks about 'thoughts of suicide or self-harming'. Because asking this question could induce unnecessary distress for some individuals, it was removed and resulted in the creation of the PHQ-8. This version has been widely used in several studies and has shown high levels of reliability (Coefficient alpha: 0.90) (Kroenke et al., 2009; Skopp, Luxton, Bush & Sirotin, 2011; M. Smith, Gotman, Lin & Yonkers, 2010). For the present study, the PHQ-8 was used to collect data on symptoms of depression of the participants.

The fourth section utilised the Relationship Assessment Scale (RAS) to investigate the level of relationship satisfaction. The RAS was developed primarily for married couples. However, after being revised, this scale is now applicable for use in other types of relationships including couples who are engaged, dating, and cohabiting (Vaughn & Matyastik Baier, 1999). The reliability of this tool has been shown to vary from 0.86 to 0.91 (Hendrick, 1988; Vaughn & Matyastik Baier, 1999). RAS includes 7 multiple-choice questions that assess the level of relationship satisfaction. A 5-point Likert scale is used to score the items. Because the "RAS is not limited to marriage relationships" (Vaughn & Matyastik Baier, 1999, p. 145), it can be used to evaluate relationship satisfaction in any type of commitment including marital relationships, dating couples, cohabiting couples and gay couples (Hendrick, 1988; Hendrick, Dicke & Hendrick, 1998).

In summary, the three standardised questionnaires used in this study have been used in previous studies across Australia with reasonable response rates. The RAS-7 has been validated and used in many studies (Howard, O'Neill & Travers, 2006; McCabe & O'Connor, 2010). In addition, studies on depression have used the PHQ-8 and validation of this tool for Australian population has been documented in the literature (Gunn, 2010; Hides et al., 2007; Mao et al., 2009). The FSFI has also been validated and used in many studies in Australia (Conaglen, O'Connor, McCabe & Conaglen, 2010; Nijland et al., 2008; Watson & Halford, 2010). Because the demographics of the participants of this study were comparable with those of other studies conducted in Australia, the instruments were assessed as being appropriate to be used in the present study.

The fifth and last section of the questionnaire comprised the qualitative component of the study with seven open-ended questions. Response to these questions was not mandatory because creating and inputting responses may have added a burden for some women. The first two questions asked about factors that made women happy or unhappy with their sexual relationships. The third and fourth questions asked about the impact of pregnancy and childbirth on their sexual function and the fifth and sixth questions enquired about the impact of pregnancy and childbirth on their mental health. The final question asked women if they had any comments that had not been addressed in the previous questions. Women were also asked not to provide their names or contact details in this section. The time required to complete the entire questionnaire was approximately 30 minutes.

3.7 Procedures

Approval for the proposal was received from the Graduate Studies Committee in the Faculty of Health Science and ethics approval was obtained from the Human Research Ethics Committee (HREC) at Curtin University (Approval No. HR171/2011). Women who had given birth 0-12 months ago were invited to participate through flyers (Appendix A) distributed in public places including community libraries, shopping centres and bus and train stations. An invitation letter (Appendix B), which included information about the study and the link to the online

questionnaire, was posted on selected Facebook pages. In order to place the link to the study on various search engines, information about the study and the link to the questionnaire were submitted to the 123 Submit and Dream Submit website submission programs. Emails containing information about the study and the link to the questionnaire were sent to the managers of childcare centres who were requested to forward the link of the questionnaire to networks connected to women who had given birth in the previous 0-12 months. In addition, notices were placed in community papers in Western Australia including the *Parents Paper* and *Southern Gazette*. Snowball sampling was also expected to occur, as participants were asked to pass the website link to friends, family members and relatives who might be interested in participating. In order to filter out individuals living in other countries, participants were asked to specify the Australian state or the country in which they lived at the time of completing the questionnaire.

After connecting to the project website and prior to responding to any of the questions, passive consent was obtained from participants. The first two pages of the study website contained information (Appendix B) about the study including the purpose of the study, time required to complete the questionnaire, inclusion criteria, and the potential risks, discomforts and benefits of participating. Women were informed that they provided their consent by completing and submitting the questionnaire. In addition, participants were assured of their anonymity and confidentiality of their responses. Then, participants were directed to the multisection online questionnaire. The questionnaire was available for four months, from May to August 2012, until the required number of participants completed the questionnaire.

3.8 Data analysis

3.8.1 Quantitative data analysis

After participants completed the online questionnaire using SurveyMonkey, their responses were downloaded into a SurveyMonkey database.

The data were then downloaded from the website into the Statistical Package for Social Science, Advanced Statistics, Release 18.0 (SPSS for windows, SPSS Inc., Chicago, IL, USA) and analysed using appropriate statistical tests.

All responses appeared in the data view spreadsheet of SPSS. Each answer choice was then assigned both a numeric value and a variable label name in order to be ready for analysis.

In order to analyse the data, three categories of data were created. The creation of each category is described in the following section.

Firstly, the FSFI contained 19 items that were scored on a Likert basis. The Likert scale for questions 1, 2, 15 and 16 ranged from 1 to 5. All other items had a 6 point Likert scale ranging from 0 to 5. The item scores were computed for the six domains of sexual function including desire, arousal, lubrication, orgasm, satisfaction and pain. Each domain score was multiplied by a relative factor.

Domain	Question	Factor	Minimum score	Maximum score	Score range
Desire	1 & 2	0.6	1.2	6	1-5
Arousal	3, 4, 5 & 6	0.3	0	6	0-5
Lubrication	7, 8, 9 & 10	0.3	0	6	0-5
Orgasm	11, 12 & 13	0.4	0	6	0-5
Satisfaction	14, 15 & 16	0.4	2	6	0 (or 1)-5*
Pain	17, 18 & 19	0.4	0	6	0-5

*Range for item 14: 0-5; Range for items 15 & 16: 1-5

The score of the domain of 'desire' ranged from 1.2 to 6. For the other 5 domains, the scores ranged from 0 to 6. In order to calculate the total score of the FSFI, the domain scores were computed and a total score of 26 or less was considered as sexual dysfunction (Rosen et al., 2000; Wiegel, Meston & Rosen, 2005).

Secondly, symptoms of depression were assessed using the PHQ-8. It had 8 items and there were four response options for each item. A 4-point Likert scale was used to score items from 0 (not at all) to 3 (nearly every day) and the options were scored from 0 to 3 based on the severity of the symptom. The total score for the scale ranged from 0 to 24. A participant's total score of 0-9 indicated no depression or mild depressive symptoms and a cut-off score of 10 or greater was considered as current depression (Kroenke et al., 2009).

Thirdly, the RAS contained seven items. Each item had five options that were scored on a Likert basis from 1 (not satisfied) to 5 (very satisfied). The total score for the scale was calculated by summing each item score and dividing by 7. A mean score of 4 or higher indicated relationship satisfaction and a mean score of less than 4 indicated dissatisfaction with the relationship (Hendrick et al., 1998).

Descriptive statistics were calculated for the variables of interest. Continuous variables, such as depression, sexual dysfunction and relationship dissatisfaction, were presented as mean \pm standard deviation. Categorical variables, such as parity, were presented as frequency (%) in relevant categories.

For research objective 1, 2 and 3, Chi-square test (χ^2) (Fisher's Exact test if applicable) was used to investigate the frequency distribution of sexual dysfunction, depression and relationship dissatisfaction between primiparous and multiparous postpartum women during the first year after child birth. In addition, an independent samples *t* test was used to test the difference in the scores of sexual dysfunction and its domains, depression and relationship dissatisfaction between primiparous and multiparous postpartum women during the first year after child birth.

For research objective 4, Chi-square test (χ^2) (Fisher's Exact test if applicable) was used to investigate the frequency distribution of all variables between women with and without sexual dysfunction. Furthermore, a multiple logistic regression analysis was carried out to determine the statistically significant factors potentially affecting the sexual function of postpartum women during the first year after child birth. In this analysis, sexual function was the main outcome measure and all other factors, including depression, relationship satisfaction, parity, demographics, obstetrics and gynaecological history, baby's characteristics, medical history and sexual life were considered as independent variables. A p value less than 0.05 ($p < 0.05$) was considered as statistically significant.

3.8.2 Qualitative data analysis

According to Neuman (2003), there is no single qualitative data analysis method that is broadly accepted. In the present study, the qualitative data were analysed using manual content and thematic analysis (Braun & Clarke, 2006; Liamputtong & Serry, 2011). Although computer software programmes, such as NVivo, were available, managing and analysing the data manually was chosen. This allowed the researcher to further her qualitative analysis skills and it provided her with the opportunity to become closer to the data or the participants' comments.

As noted in Chapter 1, the qualitative component of the questionnaire had six open-ended questions that asked about the sexual relationship, sexual function and mental health. The seventh and final question asked participants for other comments. The content within the three instruments that were administered in this study including the FSFI, RAS-7 and the PHQ-8 formed the broad themes, when appropriate, for analysing the data from the open-ended questions.

As the first step, the responses to each question were downloaded into Microsoft Office Word documents. During the preliminary analysis, non-related and meaningless responses were deleted. In the second step, the remaining responses were reviewed, coded and assigned to major, broad thematic categories, which were identified by different colours. During the third step, a more detailed analysis was

performed within each category and themes were identified. The emergence of patterns during the detailed coding or fourth and final step resulted in a more sophisticated level of coding, which assisted in developing conclusions. The most salient quotations for each question were selected to provide examples of the participants' voices and the quotations presented in each question are from different women.

Throughout the analysis, the researcher and supervisor met to discuss the analysis steps and findings. In addition, the final analysis and discussion were repeatedly discussed.

3.9 Ethical Issues

The present research adhered to the following Curtin University Human Research Ethics Committee guidelines (Human Research Ethics Committee, 2012):

- **Consent:** Because sensitive information including sexual function, depression, and relationship satisfaction was asked in this study, women were requested to read the invitation letter thoroughly. They were informed that by submitting the online questionnaire, they were giving their consent to participate in the study.
- **Voluntary participation:** Women were informed about the voluntary nature in the invitation letter, they could simply ignore the invitation and not complete the questionnaire or they could discontinue responding if they felt uncomfortable. Women could complete the questionnaire whenever they wished, and wherever they deemed it appropriate to access the internet. That is, they could access the survey website within the privacy of their home or at a location of their choosing such as a library or a friend's or relative's house.
- **Anonymity and confidentiality:** The collected information was anonymous. No identification information was requested; thus, the confidentiality of the responses was protected in this study. The data were collectively analysed and the results of the

research presented using aggregated data such as numbers and percentages or means in groups and not individual information.

- Enquiries: The contact details of the executive officer at the Ethics Committee at Curtin University were provided in the information section for participants to ask any questions about the study.

3.10 Resources

Financial resources required to carry out the present research came from funds allocated to doctoral students made available by the Faculty of Health Sciences at Curtin University. Other required resources, such as printing the invitation letter, were provided by the School of Public Health.

Chapter 4: Results of the quantitative component of the study

4.1 Introduction

Data from the responses of 325 participants were downloaded from SurveyMonkey into the Statistical Package for the Social Sciences (SPSS) version 17 for Windows. While the original dataset was still in SurveyMonkey, the data downloaded into SPSS were cleaned, recoded and labeled. Also, new variables, including FSFI total score and domain scores for desire, arousal, lubrication, orgasm, satisfaction and pain, PHQ-8 total score and RAS total score, were created to address the objectives of the study and the data were properly formatted for statistical analysis.

Table 1 shows the demographic characteristics of the women who participated in the study using the chi-square test. The proportion of primiparous women in both 18-20 and 21-30 age groups was larger than that of multiparous women (9.2% vs. 2.1%, and 55.2% vs. 51.3%, respectively). On the other hand, the percentage of multiparous women in the 31-40 age group was greater than that of primiparous ones (46.6% vs. 35.6%, respectively). Multiparous women were older than primiparous and the difference between the groups was statistically significant ($p=0.007$).

Although primiparous women were more likely than multiparous women to hold university degrees (68.9% vs. 63%, respectively), there was no statistically significant difference between groups regarding their level of education ($p=0.096$).

Almost half of the population of multiparous women had no formal occupation while one-third of primiparous women reported that they were not employed (46.6% vs. 31%, respectively). On the other hand, primiparous women were more likely than multiparous ones to have part-time jobs (27.6% vs. 21.8%, respectively) or full-time jobs (27.6% vs. 15.1%, respectively). The difference between the two groups was shown to be statistically significant ($p=0.03$).

Multiparous women were more likely than primiparous women to have an annual family income above \$50000 (66.4% vs. 65.5%, respectively). However, the difference between the groups was not statistically significant ($p=0.895$).

Table 1: Demographic characteristics of primiparous and multiparous women

Demographic \ Parity	Primiparous (n=87)		Multiparous (n=238)		P value
	N	%	N	%	
Age					0.007*
18-20	8	9.2	5	2.1	
21-30	48	55.2	122	51.3	
31-40	31	35.6	111	46.6	
Education					0.096
Diploma or lower	27	31.1	88	37	
Associate's degree	16	18.4	57	23.9	
Bachelor's degree	37	42.5	62	26.1	
Master's degree or higher	7	8	31	13	
Career					0.03*
Student	5	5.7	21	8.8	
No formal occupation	27	31	111	46.6	
Casual work	7	8	18	7.6	
Part-time work	24	27.6	52	21.8	
Full-time work	24	27.6	36	15.1	
Annual income of family					0.895
Less than \$ 50000	30	34.5	80	33.6	
\$ 50000 +	57	65.5	158	66.4	

*p<0.05

Table 2 shows the ethnicity of the respondents using the chi-square test. Almost half of the population of primiparous and multiparous postpartum women identified themselves as Australian (42.5% and 42.4%, respectively). Other ethnic groups reported included European (21.8% and 16.4%, respectively), American (17.2% and 23.9%, respectively), Asian, (8% and 3.4%, respectively), New Zealander (3.4% and 3.4%, respectively) and other (6.9% and 10.5%, respectively). No statistically significant difference was found between the two groups regarding their ethnic background ($p=0.558$).

Table 2: Ethnic groups of primiparous and multiparous postpartum women

<div> <div>Parity</div> <div>Ethnicity</div> </div>	Primiparous (n=87)		Multiparous (n=238)		P value
	N	%	N	%	
Australian	37	42.5	101	42.4	0.558
European	19	21.8	39	16.4	
American	15	17.2	57	23.9	
Asian	7	8	8	3.4	
New Zealander	3	3.4	8	3.4	
Other	6	6.9	25	10.5	

Table 3 shows the women's choice of contraception using the chi-square test. At the time of participation 20.7% of primiparous women reported that they were not preventing pregnancy, compared to 8% of multiparous women. Considering every single method of preventing pregnancy, multiparous women were more likely than primiparous ones to use male condoms (17.6% vs. 14.9%, respectively), mixed methods (16.8% vs. 15%, respectively), IUD (10.9% vs. 8%, respectively), withdrawal (10.1% vs. 8%, respectively), female tubal ligation (6.3% vs. 2.2%, respectively), male vasectomy (6.3% vs. 0%, respectively), implant (3.4% vs. 2.2%, respectively), Creighton method (3.4% vs. 1.1%, respectively) and diaphragm (0.8% vs. 0%, respectively). In contrast, the following methods of preventing pregnancy were mostly used by primiparous rather than multiparous women: oral contraceptive pills (16.1% vs. 8%, respectively); breastfeeding (1.1% vs. 0.8%, respectively); and injection (1.1% vs. 0.8%, respectively). The differences between groups regarding contraceptive choices were shown to be statistically significant ($p=0.006$).

The mixed methods for the prevention of pregnancy identified by 53 respondents are as follows but not shown in Table 3 because of the small numbers: 'withdrawal and male condoms' (15), 'female tubal ligation and withdrawal' (8), 'male condoms and oral contraceptive pills' (7), 'male condom, female tubal ligation and withdrawal' (5), 'male condom and IUD' (4), 'male condom and female tubal ligation' (4), 'breastfeeding and withdrawal' (4), 'breastfeeding and IUD' (3) and 'male condom and male vasectomy' (3).

Family planning methods were grouped into mechanical, natural, surgical and hormonal methods for statistical analysis. Multiparous women were shown to be more likely than primiparous ones to choose the following family planning methods: mechanical methods (29.4% vs. 23%, respectively); natural methods (14.3% vs. 10.3%, respectively); and surgical methods (12.6% vs. 2.2%, respectively). However, primiparous women were more likely than multiparous ones to use hormonal methods of preventing pregnancy (19.5% vs. 12.2%, respectively) ($p=0.006$). Thus, the difference between the two groups of women was statistically significant.

Table 3: Contraceptive choices among primiparous and multiparous postpartum women

Contraceptives \ Parity		Primiparous (n=87)		Multiparous (n=238)		P value
		N	%	N	%	
Mechanical methods	Male condom	13	14.9	42	17.6	0.006*
	Diaphragm	-	-	2	0.8	
	IUD ¹	7	8	26	10.9	
	Total	20	23	70	29.4	
Hormonal methods	Oral contraceptive pills	14	16.1	19	8	
	Implant	2	2.2	8	3.4	
	Injection	1	1.1	2	0.8	
	Total	17	19.5	29	12.2	
Surgical methods	Female tubal ligation	2	2.2	15	6.3	
	Male vasectomy	-	-	15	6.3	
	Total	2	2.2	30	12.6	
Natural methods	Creighton method ²	1	1.1	8	3.4	
	Withdrawal	7	8	24	10.1	
	Breastfeeding	1	1.1	2	0.8	
	Total	9	10.3	34	14.3	
Other	Mixed methods ³	13	15	40	16.8	
	Lesbian relationship	6	6.9	10	4.2	
	No prevention of pregnancy	18	20.7	19	8	
	No vaginal penetration	2	2.2	6	2.5	
	Total	39	44.8	75	31.5	

*p<0.05

1. Intra uterine device

2. A form of natural family planning that relies on the identification of the fertile periods during female's menstrual cycle.

3. Mixed methods are known as choosing two or more methods of prevention of pregnancy and practicing them simultaneously.

The method of delivery and birth place data were analysed using the chi-square test within primiparous and multiparous groups and also between the two groups as reported in Table 4. The rate of normal vaginal delivery (NVD) with tears/episiotomy (48.3%) was higher than other methods of birth among primiparous women. In addition, primiparous women reported to give birth in a public hospital (59.8%), which was more prevalent than other places. The rate of NVD without tears/episiotomy (45%) was higher than other methods of birth reported by multiparous women and they were more likely to give birth in a public hospital (56.3%) than other places.

When the two groups were compared, the experience of NVD with tears/episiotomy and instrumental delivery was higher among primiparous women than multiparous ones (48.3% vs. 27.3%, and 9.2% vs. 3.8%, respectively). Multiparous women were more likely than primiparous women to experience NVD without tears/episiotomy (45% vs. 26.4%, respectively) and caesarean section (23.9% vs. 16.1%, respectively). The difference between the two groups was shown to be statistically significant ($p < 0.001$).

Although primiparous women were more likely than multiparous ones to give birth in a hospital (either public or private), the difference between the two groups was not statistically significant ($p = 0.201$). Multiparous women did report higher rates of home birth than primiparous ones (23.9% vs. 13.8%, respectively) with no statistically significant difference between groups ($p = 0.201$).

Table 4: Method of delivery and birth place among primiparous and multiparous postpartum women

<div> <div>Parity</div> <div>Birthing history</div> </div>	Primiparous (n=87)		Multiparous (n=238)		P value
	N	%	N	%	
Method of Delivery					
NVD ¹ without tears/episiotomy	23	26.4	107	45	<0.001*
NVD with tears/episiotomy	42	48.3	65	27.3	
Instrumental delivery ²	8	9.2	9	3.8	
Caesarean section	14	16.1	57	23.9	
Birth place					
Public hospital	52	59.8	134	56.3	0.201
Private hospital	20	23	40	16.8	
Home	12	13.8	57	23.9	
Birth Centre	3	3.4	7	2.9	

*p<0.05

1. Normal vaginal delivery

2. With ventouse (vacuum) or forceps

The characteristics of the babies born to primiparous and multiparous women are presented in Table 5 using the chi-square test. None of the primiparous women had given birth to twins ($p=0.115$ between groups). Primiparous women birthed more baby boys than did multiparous women (50.6% vs. 46.2%, respectively), while multiparous women birthed more baby girls (50.4% vs. 49.4%, respectively) with no statistically significant difference between the two groups ($p=0.553$).

The majority of women in the two groups (73.6% primiparous and 68.9% multiparous women) gave birth to babies who were within normal birth weight (2500-4000 grams). Compared to primiparous women, multiparous ones had a greater number of babies with low birth weight (birth weight less than 2500 grams) (16.8% vs. 13.8%, respectively) or high birth weight (birth weight more than 4000 grams) (14.3% vs. 12.6%, respectively). However, the difference between the two groups concerning birth weight of their babies was not statistically significant ($p=0.714$).

Although the proportion of ill babies born to multiparous women was more than that of primiparous ones (7.6% vs. 3.4%, respectively) the difference between groups was not statistically significant ($p=0.213$).

Of the 21 cases of babies born with illnesses (and not shown in Table 5), the following illnesses were reported: gastro-oesophageal reflux disease (3), 'cow's milk intolerance' (2), 'jaundice' (2), 'developmental dysplasia of the hips' (2), 'asthma and reflux' (1), 'asthma and autism' (1), 'bilateral pneumothorax' (1), 'cerebral palsy' (1), 'cleft lip/palate and other illness' (1), 'congenital heart disease' (1), food protein induced enterocolitis syndrome (1), 'gastric reflux and hip dysplasia' (1), 'high blood pressure' (1), 'hip dysplasia, club foot, torticollis and reflux' (1), 'intellectually impaired' (1) and 'anterior polar cataracts' (1).

Table 5: Characteristics of the babies born to primiparous and multiparous postpartwomen

Parity Baby characteristics	Primiparous (n=87)		Multiparous (n=238)		P value
	N	%	N	%	
Single birth	87	100	230	96.6	0.115
Twin birth	-	-	8	3.4	
Gender of the baby					0.553
Boy	44	50.6	110	46.2	
Girl	43	49.4	120	50.4	
Two boys (twins)	-	-	4	1.7	
Two girls (twins)	-	-	4	1.7	
Birth weight					0.714
Less than 2500 grams	12	13.8	40	16.8	
2500-4000 grams	64	73.6	164	68.9	
More than 4000 grams	11	12.6	34	14.3	
Giving birth to an ill baby					0.213
Yes	3	3.4	18	7.6	
No	84	96.6	220	92.4	

The data on breastfeeding, sleep hours, cigarette smoking and alcohol consumption were analysed using the chi-square test within primiparous and multiparous groups and between the two groups. The results are reported in Table 6. Primiparous women reported the following: not smoking (90.8%); 7⁺ hours of sleep in a 24 hours period (59.8%); not consuming alcohol (58.6%); regular menstrual bleeding (51.7%); and partial breastfeeding (40.2%). Multiparous women reported the following: not smoking (90.3%); not consuming alcohol (57.1%); non-regular menstrual bleeding (53.8%); 7⁺ hours of sleep in a 24 hour period (53.8%); and exclusive breastfeeding (40.3%).

When the two groups were compared, multiparous and primiparous women differed according to patterns of breastfeeding but were not statistically significant ($p=0.211$). Multiparous women were more likely than primiparous ones to exclusively breastfeed their babies (40.3% vs. 10.9%, respectively) or not to breastfeed their babies (26.9% vs. 10.9%, respectively). Primiparous women were more likely than their multiparous counterparts to partially breastfeed their babies (40.2% vs. 32.8%, respectively).

Primiparous women were more likely than multiparous ones to experience regular menstrual bleeding after childbirth. However, there was no statistically significant difference between the two groups in this regard ($p=0.384$). Although primiparous women reported more hours of sleep within a 24 hour period than did multiparous ones (59.8% vs. 53.8%, respectively), the pattern of sleep hours in a 24 hour period was not significantly different between primiparous and multiparous women ($p=0.336$).

The proportion of primiparous and multiparous women, who did not smoke cigarettes, was almost the same (90.8% and 90.3%, respectively). Multiparous women were more likely than primiparous ones to be regular smokers (8.8% vs. 4.6%, respectively), while primiparous ones were more likely to occasionally smoke cigarettes (4.6% vs. 0.8%, respectively). The difference between the two groups was statistically significant ($p=0.045$).

The difference between primiparous and multiparous women regarding alcohol consumption was not statistically significant and more than half of the population of

primiparous and multiparous women reported not drinking alcohol (58.6% and 57.1%, respectively) ($p=0.899$).

Table 6: Patterns of breastfeeding, sleep hours, cigarette smoking and alcohol consumption among primiparous and multiparous postpartum women

	Primiparous (n=87)		Multiparous (n=238)		P value
	N	%	N	%	
Breastfeeding					0.211
No breastfeeding	26	10.9	64	26.9	
Partial breastfeeding ¹	35	40.2	78	32.8	
Exclusive breastfeeding ²	26	10.9	96	40.3	
Regular menstrual bleeding after childbirth					0.384
Yes	45	51.7	110	46.2	
No	42	48.3	128	53.8	
Sleep hours in a 24 hour period					0.336
4-6 hours	35	40.2	110	46.2	
7 ⁺ hours	52	59.8	128	53.8	
Cigarette smoking					0.045*
No smoking	79	90.8	215	90.3	
Occasionally ³	4	4.6	2	0.8	
Regularly ⁴	4	4.6	21	8.8	
Alcohol consumption					0.886
No alcohol consumption	51	58.6	136	57.1	
Light drinking ⁵	33	37.9	90	37.8	
Moderate drinking ⁶	2	2.3	10	4.2	
Heavy drinking ⁷	1	1.1	2	0.8	

* $p<0.05$

1. Feeding the baby with breastmilk in addition to formula or baby food
2. Feeding the baby with only breastmilk
3. Less than 4 days per week
4. Almost every day
5. 2-6 standard drinks per week
6. 7-10 standard drinks per week
7. 11 or more standard drinks per week

Table 7 shows the patterns of breastfeeding among the women using the chi-square test. During 0-5 months after childbirth, the rate of exclusive breastfeeding was higher among multiparous women than primiparous ones (25.6% vs. 14.9%, respectively). Primiparous women were more likely than multiparous ones to partially breastfeed (9.2% vs. 2.5%, respectively) or not to breastfeed their babies (6.9% vs. 5%, respectively) during this time period, with a statistically significant difference between the two groups ($p=0.006$).

Although the proportion of primiparous women, who did not breastfeed or who partially breastfed their babies during 6-12 months after childbirth, was more than that of multiparous ones, the difference between the two groups was not statistically significant ($p=1$).

Table 7: Pattern of breastfeeding among primiparous and multiparous postpartum women during 0-5 and 6-12 months postpartum

<div> <div>Parity</div> <div>Months postpartum Breastfeeding</div> </div>		Primiparous (n=87)		Multiparous (n=238)		P value
		N	%	N	%	
0 to 5 months	No breastfeeding	6	6.9	12	5	0.006*
	Exclusive breastfeeding	13	14.9	61	25.6	
	Partial breastfeeding	8	9.2	6	2.5	
6 to 12 months	No breastfeeding	20	23	52	21.8	1
	Exclusive breastfeeding	13	14.9	35	14.7	
	Partial breastfeeding	27	31	72	30.3	

* $p<0.05$

The medical history of the women is shown in Table 8 using the chi-square test. Relative to primiparous women, multiparous ones were more likely to use hormonal medicine (10.1% vs. 3.4%) or other particular medicines (8% vs. 2.3%) after childbirth. However, the differences between the groups were not statistically significant ($p=0.068$ and $p=0.076$, respectively). The rate of undergoing pelvic operations was higher among multiparous women, compared to primiparous ones, with no statistically significant difference between groups ($p=0.493$).

The difference between primiparous and multiparous women having an illness during pregnancy was statistically significant with multiparous women reporting more prevalent illnesses during pregnancy (23.9% vs. 11.5%) ($p=0.019$).

Not shown in Table 8 because of the small numbers, 10 primiparous women reported suffering the following illnesses during pregnancy: high blood pressure (2), cholestasis (1), gastroenteritis (1), gestational diabetes (1), hypoglycemia (1), pelvic floor instability (1), sciatica (1), tachycardia and sleep apnea (1) and hyperemesis gravidarum (1). Similarly the numbers of multiparous women reporting specific illnesses during pregnancy were small and they are not reported in Table 8. The 57 illnesses reported included: anaemia and influenza (9), appendicitis and high blood pressure (8), hyperemesis gravidarum (7), gestational diabetes (6), gallbladder problems (3), gastroenteritis (3), sinus infection (2), symphysis pubis dysfunction (2), high blood pressure and gestational diabetes (1), bronchitis (1), carpal tunnel syndrome (1), common cold and food poisoning (1), dehydration (1), depression and hypothyroidism (1), giardiasis and broken bones (1), gestational diabetes and obstetrics cholestasis (1), lupus (1), hypoglycemia (1), pelvic girdle pain (1), pneumonia (1), severe anemia and cold (1), severe kidney infection (1), severe nausea and obstetrics cholestasis (1), flu, strained ligaments/joint injury, hypoglycemia and arthritis symptoms (1), vertigo (1) and viral meningitis (1).

There was a statistically significant difference ($p=0.024$) between the two groups regarding postnatal depression; 15.5% of multiparous women were clinically

diagnosed with postnatal depression after childbirth, compared to 5.7% of primiparous women.

Table 8: Medical history of primiparous and multiparous postpartum women

Parity Medical history	Primiparous (n=87)		Multiparous (n=238)		P value
	N	%	N	%	
Use of hormonal medicines					
No	84	96.6	214	89.9	0.068
Yes	3	3.4	24	10.1	
Use of particular medicines					
Yes	2	2.3	19	8	0.076
No	85	97.7	219	92	
Pelvic operations					
Laparoscopy	2	2.3	3	1.3	0.493
Bladder prolapse repair	-	-	2	0.8	
Ovariectomy	-	-	1	0.4	
None	85	97.7	232	97.5	
Illness during pregnancy					
Yes	10	11.5	57	23.9	0.019*
No	77	88.5	181	76.1	
Being clinically diagnosed with postnatal depression					
Yes	5	5.7	37	15.5	0.024*
No	82	94.3	201	84.5	

*p<0.05

Table 9 reports on the usual sexual activity of the women using the chi-square test. Although more primiparous women than multiparous ones (12.6% vs. 8.8%) reported having no sexual activity after childbirth, there was no statistically significant difference between the two groups ($p=0.568$). When comparing the two groups, primiparous women were similar to their multiparous counterparts in terms of practicing a single method of sexual activity, while multiparous women were more likely to report practicing mixed methods of sexual activities, but the difference was not statistically significant ($p=0.568$).

More than one-third of the study population (primiparous and multiparous women) reported a single method of sexual activity (37.9% and 37.4%, respectively) as their usual sexual practice. The most prevalent type of single sexual activity was reported to be vaginal sex by both primiparous and multiparous women (35.6% and 36.1%, respectively). The rate of masturbation was similar between primiparous and multiparous women (1.15% and 1.3%, respectively).

Half of the primiparous and multiparous women usually practiced mixed methods of sexual activities (49.4% and 53.8%, respectively). The most prevalent types of mixed sexual activities were reported to be a combination of 'masturbation, oral and vaginal sex' (18.4% primiparous and 18.1% multiparous women) and 'oral and vaginal sex' (16.1% primiparous and 16.4% multiparous women).

Table 9: Type of sexual activity of postpartum primiparous and multiparous women

Sexual life		Parity	Primiparous (n=87)		Multiparous (n=238)		P value
			n	%	n	%	
Type of sexual activity	No sexual activity		11	12.6	21	8.8	0.568
	Single method	Vaginal sex	31	35.6	86	36.1	
		Masturbation	1	1.1	3	1.3	
		Anal sex	1	1.1	-	-	
		Total	33	37.9	89	37.4	
	Mixed method of sex	Oral & vaginal sex	14	16.1	39	16.4	
		Masturbation & vaginal sex	6	6.9	25	10.5	
		Masturbation, oral & vaginal sex	16	18.4	43	18.1	
		Oral, vaginal & anal sex	2	2.3	8	3.4	
		Masturbation, oral, vaginal & anal sex	5	5.7	13	5.5	
		Total	43	49.4	128	53.8	

Table 10 reports on the frequency of sex, resumption of intercourse after childbirth and initiator of sex among primiparous and multiparous postpartum women using the chi-square test. Primiparous women were more likely than their multiparous counterparts to have no sexual activity after childbirth (12.6% vs. 8.8%, respectively). A greater proportion of primiparous than multiparous women reported sexual activity once weekly or more (58.6% vs. 51.3%, respectively). On the other hand, multiparous women were more likely than primiparous ones to have sex less frequently (once fortnightly or less) (22.7% vs. 29.9%, respectively). The frequency of sexual activity was not significantly different between primiparous and multiparous women ($p=0.56$).

The resumption of sex during the first two months after childbirth was more prevalent among multiparous women than their primiparous counterparts (71.8% vs. 56.3%, respectively). However, primiparous women were more likely than multiparous ones to postpone sexual activity until nine weeks postpartum (34.5% vs. 18.1%, respectively). The difference between the two groups was statistically significant based on the resumption of sexual activity after childbirth ($p=0.011$).

More than one-third of the primiparous and multiparous women (35.6% and 42.9%, respectively) reported that sex was usually initiated by their partners. Sex, 'equally initiated by the woman and her partner', was reported by 37% of multiparous and 13.9% of primiparous women. The rate of 'the initiation of sex by the woman' was higher among primiparous women than multiparous ones (13.8% vs. 11.3%, respectively). However, no statistically significant difference was found between the two groups in this regard ($p=0.558$).

Table 10: Frequency of sex, resumption of intercourse and initiator of sex among primiparous and multiparous postpartum women

Sexual life	Parity		Primiparous (n=87)		Multiparous (n=238)		P value
	n	%	n	%	n	%	
Frequency of sex							
No sexual activity	11	12.6	21	8.8			0.26
Once weekly or more	51	58.6	122	51.3			
Once a fortnight or less	25	28.7	95	39.9			
Resumption of sex after childbirth							
No sexual activity	11	12.6	21	8.8			0.011*
0 - 8 weeks	49	56.3	171	71.8			
9+ weeks	30	34.5	43	18.1			
The sex was usually initiated by:							
The woman	12	13.8	27	11.3			0.558
Her partner	31	35.6	102	42.9			
Woman and her partner, equally	33	13.9	88	37			
No sexual activity	11	12.6	21	8.8			

*p<0.05

Table 11 shows the distribution of sexual problems, depression and relationship dissatisfaction among the women. The results showed that 64.3% of the entire population of postpartum women experienced sexual dysfunction. The most prevalent forms of sexual dysfunction were reported to be as follows: sexual desire disorder (81.2%), followed by sexual dissatisfaction (70.5%), orgasmic dysfunction (53.5%), and arousal disorder (52.3%). Lubrication disorder and pain disorder were reported to be less prevalent than other sexual problems by 43.4% and 39.4% of participants, respectively.

When analysed as a group, less than one-third (24%) of participants in the study reported symptoms of depression. However, more than one-third (37.2%) of participants in the study reported being dissatisfied with their relationship.

Table 11: Distribution of sexual problems, depression and relationship dissatisfaction

	n	%
Female sexual dysfunction	209	64.3
Domains:		
Sexual desire disorder	264	81.2
Sexual arousal disorder	170	52.3
Lubrication difficulty	141	43.4
Orgasmic problems	174	53.5
Sexual dissatisfaction	229	70.5
Sexual pain disorder	128	39.4
Depression	78	24
Relationship dissatisfaction	121	37.2

Table 12 reports the mean scores of the FSFI with its six domains, PHQ-8 and RAS, during 0-5 and 6-12 months postpartum among the women using the independent samples *t* test. Although the mean score of the FSFI was less than 26 during both 0-5 and 6-12 months postpartum (19.03 ± 9.18 vs. 22.89 ± 8.72 , respectively), women reported lower scores during the first five months after childbirth, indicating their higher level of sexual dysfunction during this time period with statistically significant differences between 0-5 and 6-12 months postpartum ($p < 0.001$).

In addition, regarding the six domains of the FSFI, women reported lower scores for one domain, sexual desire, during 0-5 compared to 6-12 months after delivery (3.07 ± 1.36 vs. 3.2 ± 1.37 , respectively), indicating a lower level of sexual desire during 0-5 months postpartum. No statistically significant difference was found between 0-5 and 6-12 months after childbirth in this regard ($p = 0.426$). Mean scores for the other five domains including arousal, lubrication, orgasm, satisfaction and pain were statistically significantly lower during 0-5 months postpartum, compared to 6-12 months after childbirth, indicating that women were more likely to have sexual arousal problems, lubrication difficulties, orgasm difficulties, sexual dissatisfaction and pain disorder during 0-5 months after childbirth ($p < 0.05$).

The mean score of the PHQ-8 was higher during 0-5 months than 6-12 months postpartum (6.97 ± 5.68 vs. 6.26 ± 5.54) indicating that participants were more likely to experience symptoms of depression during 0-5 months after childbirth. No statistically significant difference was found between the two time periods in relation to the severity of depression ($p = 0.289$).

Women reported a similar level of relationship satisfaction during 0-5 months and 6-12 months after childbirth (3.98 ± 0.85 and 3.99 ± 0.86) and no statistically significant difference was found between the two time periods regarding the level of relationship satisfaction among the participants ($p = 0.931$).

Table 12: Mean scores of the FSFI with its domains, PHQ-8 and RAS during 0-5 and 6-12 months postpartum

Measure \ Time	0-5 months		6-12 months		t (df=323)	P value
	M**	SD***	M**	SD***		
FSFI (overall mean score)	19.03	9.18	22.89	8.72	-3.67	<0.001*
Domains:						
Desire	3.07	1.36	3.2	1.37	-0.79	0.426
Arousal	3.01	1.86	3.73	1.77	-3.39	0.001*
Lubrication	3.41	2.02	4.16	1.85	-3.31	0.001*
Orgasm	3.02	1.94	3.69	1.94	-2.9	0.004*
Satisfaction	3.03	1.56	3.72	1.56	-3.74	<0.001*
Pain	3.47	2.06	4.36	1.84	-3.93	<0.001*
PHQ-8	6.97	5.68	6.26	5.54	1.06	0.289
RAS	3.98	0.85	3.99	0.86	-0.08	0.931

*p<0.05 **M: Mean ***SD: Standard deviation

Table 13 reports on the mean scores of the FSFI, PHQ-8 and RAS according to the sexual orientation of postpartum women using the independent samples *t* test. Although not statistically significant ($p>0.05$), women in a heterosexual relationship differed from women in a same-sex relationship according to the mean scores of the FSFI, PHQ-8 and RAS. The mean score of the FSFI was lower among women in a same-sex relationship indicating that they were more likely than heterosexual women to experience sexual problems after childbirth. On the other hand, the mean score of the PHQ-8 was lower for women in a same-sex relationship indicating a lower level of depression compared with heterosexual women. A higher score for the RAS for women in a same-sex relationship showed that they had higher levels of relationship satisfaction than did heterosexual women.

Table 13: Mean score and standard deviation of the FSFI, PHQ-8 and RAS according to sexual orientation of postpartum women

Sexual orientation Measure	Women in same-sex relationships (n=16)		Women in heterosexual relationships (n=309)		t (df=323)	P value
	M**	SD***	M**	SD***		
FSFI	21.63	10.56	21.63	8.98	0.00	1
PHQ-8	5.87	5.14	6.53	5.61	0.45	0.684
RAS	4.29	0.5	3.97	0.87	-1.43	0.152

**M: Mean

***SD: Standard deviation

4.2 Objective one

Data from the quantitative component of the study were used to address objective one, which was to assess sexual function of primiparous and multiparous postpartum women during the first year after childbirth and to identify the potential distribution of sexual dysfunction/problems among the participants.

Table 14 shows categorical scores on the FSFI among the women using the chi-square test. Two-thirds (66.7%) of the entire primiparous and multiparous women reported sexual dysfunction after childbirth and it was shown that primiparous women were more likely than multiparous ones to experience sexual dysfunction (72.4% vs. 61.3%, respectively). Results also showed that approximately one-third of the population of both groups reported satisfactory sexual function (27.6% primiparous and 38.7% multiparous women). There was no significant difference between the two groups ($p=0.069$).

Table 14: Categorical scores on the FSFI for primiparous and multiparous postpartum women

Measure score \ Parity	Primiparous (n=87)		Multiparous (n=238)		P value
	n	%	n	%	
FSFI					
≤ 26 (with sexual dysfunction)	63	72.4	146	61.3	0.069
> 26 (without sexual dysfunction)	24	27.6	92	38.7	

As indicated in Table 15, with the use of the independent samples *t* test, the overall mean scores of the FSFI were less than 26 for both primiparous and multiparous women indicating that both groups experienced sexual dysfunction after childbirth. Although primiparous women obtained a slightly higher score on the total FSFI than did multiparous ones (21.81 ± 8.42 vs. 21.57 ± 9.28 , respectively), there was no statistically significant difference in severity of sexual dysfunction between the two groups ($p=0.832$).

The mean scores for the six domains of sexual function are also shown in Table 15. Compared to the scores of the six domains for multiparous women, primiparous ones obtained slightly higher mean scores on five domains including desire, arousal, lubrication, orgasm and sexual satisfaction indicating better functioning in these domains, with no statistically significant differences between the two groups. However, multiparous women were shown to have a higher mean score for pain indicating a lower level. No statistically significant difference was found between the two groups regarding their experience of pain ($p=0.371$).

Table 15: Mean scores of sexual function and its domains for primiparous and multiparous postpartum women

Sexual function	Primiparous (n=87)		Multiparous (n=238)		t (df=323)	P value
	M**	SD***	M**	SD***		
Female Sexual Function Index (overall mean score)	21.81	8.42	21.57	9.28	0.21	0.832
Domains:						
Desire	3.24	1.31	3.13	1.38	0.64	0.521
Arousal	3.63	1.74	3.45	1.87	0.8	0.424
Lubrication	3.93	1.77	3.91	1.99	0.06	0.952
Orgasm	3.53	1.89	3.45	1.99	0.29	0.765
Satisfaction	3.55	1.54	3.48	1.62	0.38	0.698
Pain	3.91	1.87	4.13	1.99	-0.89	0.371

**M: Mean

***SD: Standard deviation

The FSFI included six domains: desire, arousal, lubrication, orgasm, satisfaction and pain. Each domain was assessed by three items, with one exception. The desire domain had two items. A score of less than four (4) for each item was considered as a sexual difficulty. Table 16 reports the mean score of items of the six domains of FSFI among the women using the independent samples *t* test.

Primiparous women obtained higher scores on the two items in the desire domain. The first item of the desire domain asked about the frequency of sexual desire and interest. The mean scores were low in both groups indicating less frequent sexual desire and interest. There was no statistically significant difference between the two groups regarding their frequency of sexual desire ($p=0.709$). The second item asked about the level of sexual desire. Results showed that primiparous women obtained a slightly higher score on this item than did multiparous ones (2.72 ± 1.11 vs. 2.59 ± 1.2 , respectively). However, the mean scores for both groups were less than four and signified low levels of sexual desire in women of both groups with no statistically significant difference between the two groups ($p=0.389$).

Although primiparous women obtained higher scores on the four items of the arousal domain than did multiparous ones, the mean scores on the four items were less than four for both groups indicating less frequent sexual arousal, low levels of sexual arousal, less confidence in becoming sexually aroused and less satisfaction with sexual arousal, with no statistically significant differences between the two groups ($p>0.05$). Both groups were shown to experience overall high levels of sexual arousal problems.

With regard to the four items in the lubrication domain, the mean scores were less than four in both groups indicating lubrication difficulties. Compared to multiparous women, primiparous ones reported experiencing more frequent lubrication, to be more able to maintain lubrication to the end of sexual activity and to have less difficulty with maintaining lubrication, while multiparous women reported less difficulty with becoming lubricated. No statistically significant differences were found between the two groups ($p>0.05$).

Scores less than four on the three items of the orgasm domain reported by the two groups demonstrated orgasm difficulties among primiparous and multiparous participants. Comparing the two groups, multiparous women had more frequent orgasm, while primiparous women had less difficulty reaching orgasm and more satisfaction with having an orgasm. The differences between the two groups for all three items, however, were not statistically significant ($p>0.05$).

Both groups had scores less than 4 on the three items in the sexual satisfaction domain with no statistically significant differences between the two groups. Compared to multiparous women, primiparous participants had higher mean scores on three items including satisfaction with the following: amount of closeness with the partner, satisfaction with the sexual relationship and satisfaction with overall sexual life. The differences between the two groups were not statistically significant ($p>0.05$).

Both groups had scores less than 4 for the three items in the pain domain. Relative to primiparous women, multiparous participants reported higher scores on the three items indicating less frequent pain during vaginal penetration, less frequent pain following vaginal penetration and a lower level of pain during or following vaginal penetration. There was no statistically significant difference between the two groups ($p>0.05$).

Table 16: Mean score of items of the FSFI among primiparous and multiparous postpartum women

<div> <div>Parity</div> <div>FSFI: Items of the six domains</div> </div>	Primiparous (n=87)		Multiparous (n=238)		t (df=323)	P value
	M**	SD***	M**	SD***		
Desire						
Frequency of desire and interest	2.67	1.19	2.62	1.2	0.37	0.709
Level of desire	2.72	1.11	2.59	1.2	0.86	0.389
Arousal						
Frequency of arousal	3.25	1.6	3.02	1.74	1.06	0.288
Level of arousal	3	1.52	2.8	1.56	1.01	0.312
Confidence with arousal	2.87	1.42	2.77	1.52	0.51	0.609
Satisfaction with arousal	3	1.62	2.9	1.71	0.43	0.663
Lubrication						
Frequency of lubrication	3.27	1.67	3.1	1.75	0.43	0.662
Difficulty with lubrication	3.24	1.52	3.34	1.67	-0.48	0.629
Frequency of maintaining lubrication	3.18	1.63	3.16	1.78	0.07	0.942
Difficulty in maintaining lubrication	3.4	1.59	3.36	1.73	0.17	0.863
Orgasm						
Frequency of orgasm	2.77	1.69	2.86	1.78	-0.43	0.666
Difficulty with orgasm	3.09	1.61	2.95	1.71	0.65	0.514
Satisfaction with orgasm	2.96	1.64	2.82	1.68	0.67	0.5
Sexual satisfaction						
With amount of closeness with partner	3.09	1.49	3	1.64	0.41	0.678
With a sexual relationship	2.96	1.33	2.89	1.38	0.38	0.7
With overall sex life	2.83	1.32	2.79	1.34	0.26	0.789

Pain						
Frequency during vaginal penetration	3.03	1.69	3.33	1.71	-1.4	0.16
Frequency following vaginal penetration	3.42	1.72	3.49	1.74	-0.32	0.746
Level during or following vaginal penetration	3.23	1.53	3.5	1.65	-0.87	0.382

**M: Mean

***SD: Standard deviation

In summary, both groups reported mean scores less than four on the FSFI indicating the presence of sexual dysfunction. The prevalence of sexual dysfunction was higher among primiparous women than multiparous ones with no statistically significant difference between the two groups ($p>0.05$). The two groups also reported similar low scores for each domain ($p>0.05$).

4.3 Objective two

Objective two was addressed with reference to the quantitative data. The data were used to investigate depression of primiparous and multiparous postpartum women during the first year after childbirth, and to identify the distribution of depression among the participants.

As shown in Table 17 using the chi-square test, less than one-fourth of primiparous and less than one-third of multiparous women were found to have postnatal depression (18.4% and 26.1%, respectively). Although the rate of depression was higher among multiparous women compared to their primiparous counterparts, there was no statistically significant difference between the two groups ($p=0.187$).

Table 17: Categorical scores on the PHQ-8 for primiparous and multiparous postpartum women

Measures' score \ Parity	Primiparous (n=87)		Multiparous (n=238)		P value
	n	%	n	%	
PHQ-8					
0-9 (non-depressed or mild depression)	71	81.6	176	73.9	0.187
10+ (moderate to severe depression)	16	18.4	62	26.1	

As indicated in Table 18 using the independent samples *t* test, the overall mean score for the PHQ-8 was higher for multiparous women (6.77) than primiparous ones (5.74) indicating that multiparous women were more likely than primiparous women to experience symptoms of depression with no statistically significant difference between the groups ($p=0.143$).

Mean scores on the first item of the PHQ-8 showed that primiparous women were slightly more likely than multiparous ones to have little interest in doing things. Nevertheless, there was no statistically significant difference between the two groups ($p=0.705$). Multiparous women had higher mean scores on the second and third items of the PHQ-8 indicating that they were more likely than primiparous women to feel depressed and experience sleep problems although there were no statistically significant differences between the two groups ($p>0.05$).

The mean score for feeling tired or having little energy was higher among multiparous women than primiparous ones (1.5 ± 1.01 vs. 1.2 ± 0.9 , respectively). The difference between the two groups was shown to be statistically significant ($p=0.015$). No statistically significant difference was found between the two groups regarding changes in appetite ($p=0.691$), difficulty with concentration ($p=0.318$) and difficulty with moving or speaking (0.608). However, multiparous women reported more negative feelings about themselves after childbirth; the difference between the two groups was shown to be statistically significant ($p=0.017$).

Table 18: Mean score and standard deviation of the PHQ-8 and each item score for primiparous and multiparous postpartum women

Parity Measure	Primiparous (n=87)		Multiparous (n=238)		t (df=323)	P value
	M**	SD***	M**	SD***		
PHQ-8	5.74	5.4	6.77	5.64	-1.46	0.143
Items						
Low interest in doing things	0.78	0.95	0.73	0.86	0.37	0.705
Feeling depressed/sad	0.58	0.8	0.72	0.83	-1.31	0.189
Sleep problems	0.86	0.95	0.98	1.11	-0.93	0.352
Tiredness/little energy	1.2	0.9	1.5	1.01	-2.43	0.015*
Appetite changes	0.95	1.02	1	0.99	-0.39	0.691
Bad feelings about oneself	0.56	0.91	0.86	1.01	-2.4	0.017*
Concentration difficulties	0.51	0.87	0.63	0.91	-0.99	0.318
Moving/speaking difficulties	0.27	0.64	0.31	0.68	-0.51	0.608

*p<0.05

**M: Mean

***SD: Standard deviation

In Table 19, the results of the multiple logistic regression analysis comparing women with and without depression with respect to variables that predicted depression in postpartum women are reported. Compared to women who had a university degree, women who had a diploma or a lower level of education were more likely to experience postpartum depression (OR = 2.256, 95% CI = 1.239 – 3.848). The risk of postpartum depression was also higher among women who had sexual dysfunction (OR = 2.516, 95% CI = 1.279 – 4.95) and relationship dissatisfaction (OR = 3.752, 95% CI = 2.116 – 6.654).

Table 19: Results of multiple logistic regression analysis comparing women with and without depression with respect to variables that predicted depression in postpartum women

Variable	Crude OR	Adjusted OR	95% CI for OR	P value
Sleep hours				
7 hours or more	1	1		
4 – 6 hours	1.746	1.611	0.918 – 2.827	0.097
Education				
University degree	1	1		
Diploma or lower	1.955	2.256	1.273 – 3.998	0.005*
Sexual dysfunction				
No	1	1		
Yes	3.216	2.516	1.279 – 4.95	0.008*
Relationship dissatisfaction				
No	1	1		
Yes	4.776	3.752	2.116 – 6.654	<0.001*

*p<0.05

In conclusion, although the prevalence of postpartum depression was higher among multiparous women than primiparous ones, there was no statistically significant difference between the two groups ($p>0.05$). The two groups reported similar scores for all the items of the PHQ-8 ($p>0.05$) except for tiredness/little energy and negative feelings about oneself, which were higher among multiparous women ($p<0.05$).

4.4 Objective three

The quantitative data were analysed to address objective three, which was to examine the level of relationship satisfaction of primiparous and multiparous postpartum women during the first year after childbirth, and to investigate the distribution of relationship dissatisfaction among the participants.

Table 20 shows the RAS categorical scores among the women using the chi-square test. Participants in both groups reported a high level of relationship satisfaction with the greater percentage for primiparous women (66.7% vs. 61.3%). Approximately one-third of participants in both groups obtained scores less than 4 on the RAS indicating low levels of relationship satisfaction. A higher percentage of multiparous women reported being dissatisfied with their relationships (38.7% vs. 33.3%, respectively). The difference between the groups was not statistically significant in this regard ($p=0.437$).

Table 20: Categorical scores on the RAS among primiparous and multiparous postpartum women

Measures' score \ Parity	Primiparous (n=87)		Multiparous (n=238)		P value
	n	%	n	%	
RAS					
Less than 4 (lower relationship satisfaction)	29	33.3	92	38.7	0.437
4+ (higher relationship satisfaction)	58	66.7	146	61.3	

As reported in Table 21 using the independent samples *t* test, the mean score for the RAS was higher among primiparous women than multiparous ones (4.08 ± 0.71 vs. 3.95 ± 0.9 , respectively) indicating a higher level of relationship satisfaction among primiparous women. No statistically significant difference was found between the two groups ($p=0.238$).

Regarding the seven items included in the RAS, primiparous women reported higher scores indicating the following: their partners significantly met their needs; they were generally satisfied with their relationships; their relationships were better than that of other couples; they less frequently wished they had not entered the relationship; the relationship significantly met their original expectations; they loved their partner; and there were less problems in their relationship. No statistically significant difference on the seven items was found between the two groups ($p>0.05$).

Table 21: Mean score and standard deviation of the RAS and each item score among primiparous and multiparous postpartum women

Measure \ Parity	Primiparous (n=87)		Multiparous (n=238)		t (df=323)	P value
	M**	SD***	M**	SD***		
RAS	4.08	0.71	3.95	0.9	1.18	0.238
Items						
Met needs	3.81	0.8	3.67	1.05	1.11	0.265
General satisfaction	3.89	0.88	3.82	1.07	0.53	0.594
Compared to others' relationship	4.05	0.89	4	1.06	0.41	0.678
Regret of being in the relationship	4.43	0.88	4.31	1.04	0.93	0.352
Met expectations	3.8	1.09	3.62	1.18	1.22	0.222
To love the partner	4.65	0.62	4.55	0.86	0.99	0.323
Problems in the relationship	3.94	0.89	3.71	1.12	1.73	0.083

**M: Mean

***SD: Standard deviation

The results of multiple logistic regression analysis comparing women with and without relationship satisfaction with respect to the variables that predicted relationship dissatisfaction are given in Table 22. Annual income less than \$ 50000 was a risk factor for a lower relationship satisfaction score (OR = 1.796, 95% CI = 1.046 – 3.086). Compared to heterosexual relationships, women who were in a same-sex relationship were less likely to report experiencing relationship dissatisfaction (OR = 0.228, 95% CI = 0.054 – 0.967). Postpartum women between 6-12 months were less likely to report relationship dissatisfaction (OR = 0.529, 95% CI = 0.3 – 0.931) compared to women at 0-5 months postpartum. Sexual dysfunction (OR = 2.725, 95% CI = 1.54 – 4.189), being clinically diagnosed with depression (OR = 2.168, 95% CI = 1.042 – 4.512) and having symptoms of depression on the PHQ-8 (OR = 3.961, 95% CI = 2.186 – 7.177) were other risk factors for relationship dissatisfaction during the first year after childbirth.

Table 22: Results of multiple logistic regression analysis comparing women with and without relationship satisfaction with respect to variables that predicted relationship dissatisfaction in postpartum women

Variable	Crude OR	Adjusted OR	95% CI for OR	P value
Smoking status				
Non-smoker	1	1		
Smoker	1.92	2.051	0.881 – 4.775	0.096
Alcohol consumption				
No alcohol consumption	1	1		
Alcohol drinking	0.633	0.609	0.359 – 1.034	0.066
Sleep hours				
7 hours or more	1	1		
4 – 6 hours	1.616	1.574	0.941 – 2.633	0.084
Annual income				
\$ 50000+	1	1		
Less than \$ 50000	1.69	1.796	1.046 – 3.086	0.034*
Sexual orientation				
Heterosexual	1	1		
Lesbian	0.374	0.228	0.054 – 0.967	0.045*
Postpartum time periods				
0 – 5 months	1	1		
6 - 12 months	0.716	0.529	0.3 – 0.931	0.027*
Sexual dysfunction				
No	1	1		
Yes	3.092	2.725	1.54 – 4.189	0.001*
Clinical diagnosis of depression				
No	1	1		
Yes	2.865	2.168	1.042 – 4.512	0.038*
Depression				
No	1	1		
Yes	4.776	3.961	2.186 – 7.177	<0.001*

*p<0.05

In summary, primiparous women reported higher relationship satisfaction scores than multiparous ones. However, there was no statistically significant difference between the two groups ($p>0.05$). The two groups reported similar scores for all nine items of the RAS with no statistically significant differences between the two groups ($p>0.05$).

4.5 Objective four

Objective four was to identify the attributes of demographics, obstetrics and gynaecological history, baby's characteristics, medical history, sexual life, relationship satisfaction, parity and symptoms of depression in the occurrence of sexual dysfunction of postpartum women during the first year after childbirth, and to explore the potential links among the respective factors. The quantitative data were analysed to address this objective.

The demographic characteristics of the women with and without sexual dysfunction are presented in Table 23 using the chi-square test. No statistically significant difference was found between women with sexual dysfunction and women without sexual dysfunction regarding their age group ($p=0.18$).

The educational level of women with and without sexual dysfunction was similar and a higher percentage in both groups had a diploma (35.4% and 35.3%, respectively). There was no statistically significant difference for educational level between the two groups ($p=0.807$).

With regard to having a career, women with sexual dysfunction and without sexual dysfunction were almost identical as 44.1% vs. 44.8%, respectively, did not have a formal occupation. No statistically significant difference was found between the two groups regarding their working status ($p=0.963$).

More than two-thirds of the population of both groups (65.1% vs. 68.1%, respectively) had an annual income of \$50,000⁺. No statistically significant difference was found between the two groups regarding the family annual income and sexual dysfunction ($p=0.626$).

Table 23: Demographic characteristics of postpartum women with and without sexual dysfunction

Sexual function Demographic	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Age					0.18
18-20	11	5.3	2	1.7	
21-30	112	53.6	58	50	
31-40	86	41.1	56	48.3	
Education					0.807
Diploma	74	35.4	41	35.3	
Associate's degree	48	23	25	21.6	
Bachelor's degree	65	31.1	34	29.3	
Master's degree or higher	22	10.5	16	13.8	
Career					0.963
Student	18	8.6	8	6.9	
No formal occupation	86	41.1	52	44.8	
Casual work	16	7.7	9	7.8	
Part-time work	50	23.9	26	22.4	
Full-time work	36	18.7	21	18.1	
Annual income of family					0.626
Less than \$ 50,000	73	34.9	37	31.9	
\$ 50,000 ⁺	136	65.1	79	68.1	

Table 24 reports the ethnicity of the women with and without sexual dysfunction using the chi-square test. Being Australian was higher than other ethnic backgrounds among women in both groups, with European and American identity being second and third, respectively. The rate of sexual dysfunction was lower among women who were Asian, New Zealander and from other ethnic backgrounds including Arab, Jewish, African, Micronesian and Caribbean Islander. However, there was no statistically significant difference between women with and without sexual dysfunction regarding their ethnic background ($p=0.415$).

Table 24: Ethnic groups of postpartum women with and without sexual dysfunction

Sexual function Ethnicity	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Australian	83	39.7	55	47.4	0.415
European	44	21.1	14	12.1	
American	43	20.6	29	25	
Asian	11	5.3	4	3.4	
New Zealander	10	4.8	1	0.9	
Other	18	8.6	13	11.2	

The choice of contraception by postpartum women with and without sexual dysfunction is presented in Table 25 using the chi-square test. A greater proportion of women with sexual dysfunction than women without sexual dysfunction reported using hormonal methods (15.3% vs. 12.1%, respectively) and surgical methods (10.5% vs. 8.6%, respectively) for preventing pregnancy. On the other hand, a greater percentage of women without sexual dysfunction than women with sexual dysfunction reported using mechanical methods (30.2% vs. 26.3%, respectively) and natural methods of contraception (13.8% vs. 12.9%, respectively).

Regarding each method of preventing pregnancy, women with sexual dysfunction were more likely than women without sexual dysfunction to use male condoms (18.7% vs. 16.4%, respectively), oral contraceptive pills (11% vs. 8.6%, respectively), female tubal ligation (7.2% vs. 1.2%, respectively) and withdrawal (9.7% vs. 9.5%, respectively). On the other hand, women without sexual dysfunction were more likely than women with sexual dysfunction to use IUD (12.9% vs. 8.6%, respectively), male vasectomy (6.9% vs. 3.3%, respectively) and mixed methods (18.1% vs. 15.3%, respectively). Nevertheless, no statistically significant difference was found ($p=0.867$).

Table 25: Contraceptive choices of postpartum women with and without sexual dysfunction

Sexual function Contraceptive choices		With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
		n	%	n	%	
Mechanical methods	Male condom	36	18.7	19	16.4	0.867
	Diaphragm	1	0.5	1	0.9	
	IUD	18	8.6	15	12.9	
	Total	55	26.3	35	30.2	
Hormonal methods	Oral contraceptive pills	23	11	10	8.6	
	Implant	8	3.8	2	1.7	
	Injection	1	0.5	2	1.7	
	Total	32	15.3	14	12.1	
Surgical methods	Female tubal ligation	15	7.2	2	1.7	
	Male vasectomy	7	3.3	8	6.9	
	Total	22	10.5	10	8.6	
Natural methods	Creighton method	5	2.4	4	3.4	
	Withdrawal	20	9.7	11	9.5	
	Breastfeeding	2	1	1	0.9	
	Total	27	12.9	16	13.8	
Other	Mixed methods	32	15.3	21	18.1	
	Lesbian relationship	10	4.8	6	5.2	
	No prevention of pregnancy	23	11	14	12.1	
	No vaginal penetration	8	3.8	-	-	
	Total	73	34.9	41	35.3	

Table 26 reports on the fecundity history of postpartum women with and without sexual dysfunction using the chi-square test. The majority of participants in both groups were multiparous with no statistically significant difference between groups ($p=0.069$). Women with sexual dysfunction were more likely than women without sexual dysfunction to not have a history of miscarriage or abortion (59.8% vs. 51.7, respectively). Interestingly, with the increase in the number of miscarriages or abortion, the rate of sexual dysfunction decreased. However, there was no statistically significant difference between the two groups regarding the number of miscarriages or terminations of pregnancy ($p=0.135$).

A greater proportion of women with sexual dysfunction than women without sexual dysfunction had only one child at home. The women without sexual dysfunction were more likely than women with sexual dysfunction to have two or more children at home (69% vs. 56.5%, respectively) and the difference between the two groups was statistically significant ($p=0.033$).

Table 26: Fecundity history of postpartum women with and without sexual dysfunction

Sexual function Fecundity	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Parity					
Primiparous	63	30.1	24	20.7	0.069
Multiparous	146	69.9	92	79.3	
Miscarriage or abortion ¹					
0	125	59.8	60	51.7	0.135
1	52	24.9	26	22.4	
2+	32	15.3	30	25.9	
Number of children at home					
1 child	91	43.5	36	31	0.033*
2+ children	118	56.5	80	69	

*p<0.05

¹ Induced termination of pregnancy before 13th week of pregnancy

The methods of delivery and birth place of postpartum women with and without sexual dysfunction are presented in Table 27 using the chi-square test. A greater proportion of women without sexual dysfunction reported to have given birth via NVD without tears/episiotomy (45.7% vs. 36.8%, respectively), while the rates of NVD with tears/episiotomy, instrumental birth and CS were higher among women with sexual dysfunction than women without sexual dysfunction. No statistically significant difference was found between the two groups regarding their method of delivery ($p=0.298$).

The percentage of women who gave birth in a public hospital was higher among women with sexual dysfunction than women without sexual dysfunction (58.9% vs. 54.3%, respectively). On the other hand, women without sexual dysfunction were more likely than women with sexual dysfunction to give birth in a private hospital or at home. No statistically significant difference ($p=0.729$) was found regarding place of birth and sexual dysfunction.

Table 27: Methods of delivery and birth place of postpartum women with and without sexual dysfunction

Sexual function Method of delivery and birth place	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Method of Delivery					
NVD without tears/episiotomy	77	36.8	53	45.7	0.298
NVD with tears/episiotomy	69	33	38	32.8	
Instrumental delivery	13	6.2	4	3.4	
Caesarean section (CS)	50	23.9	21	18.1	
Birth place					
Public hospital	123	58.9	63	54.3	0.729
Private hospital	38	18.2	22	19	
Home	43	20.6	26	22.4	
Birth Centre	5	2.4	5	4.3	

Table 28 shows the characteristics of the babies born to postpartum women with and without sexual dysfunction using the chi-square test. Almost all of the women in both groups gave birth to a single baby ($p=1$). There was no statistically significant difference ($p=0.858$) in respect to the baby's gender and sexual dysfunction.

Women without sexual dysfunction were more likely than women with sexual dysfunction to have babies with a normal birth weight (2500-4000 grams) (76.7% vs. 66.5%, respectively). Women with sexual dysfunction were more likely to have overweight (more than 4000 grams) or underweight babies (less than 2500 grams). Birth weight was not an indicator of postnatal sexual dysfunction as the difference between the two groups was not statistically significant ($p=0.158$).

Women, who did not have sexual dysfunction, were more likely than women with sexual dysfunction to give birth to a healthy baby (95.7% vs. 92.3%, respectively). There was no statistically significant difference between the two groups ($p=0.346$).

Table 28: Characteristics of the babies of postpartum women with and without sexual dysfunction

<div> <div>Sexual function</div> <div>Baby characteristics</div> </div>	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Single birth	204	97.6	113	97.4	1
Twin birth	5	2.4	3	2.6	
Gender of the baby					0.858
Boy	101	48.3	53	45.7	
Girl	103	49.3	60	51.7	
Two boys (twins)	2	1	2	1.7	
Two girls (twins)	3	1.4	1	0.9	
Birth weight					0.158
Less than 2500 grams	38	18.9	14	12.1	
2500-4000 grams	139	66.5	89	76.7	
More than 4000 grams	32	15.3	13	11.3	
Giving birth to an ill baby					0.346
Yes	16	7.7	5	4.3	
No	193	92.3	111	95.7	

The patterns of breastfeeding, sleep hours, cigarette smoking and alcohol consumption among postpartum women with and without sexual dysfunction are reported in Table 29 using the chi-square test. Women with sexual dysfunction were more likely than women without sexual dysfunction to exclusively breastfeed their babies (43.1% vs. 27.6%, respectively). On the other hand, women without sexual dysfunction were more likely than women with sexual dysfunction to partially breastfeed (42.2% vs. 30.6%, respectively) or not to breastfeed their babies (30.2% vs. 26.3%, respectively). A P value of 0.017 indicated that breastfeeding was a statistically significant risk factor for sexual function after childbirth.

There was no statistically significant difference ($p=0.062$) for sleeping patterns between women with and without sexual dysfunction. The majority reported sleeping 7-9 hours in a 24 hour period ($p=0.062$). More women without sexual dysfunction than those with sexual dysfunction reported sleep of 10-11 hours in a 24 hour period (5.1% vs. 1.4%, respectively).

The majority of women in both groups reported that they did not smoke cigarettes. Although women with sexual dysfunction had higher rates of cigarette smoking, compared to women without sexual dysfunction (10.6% vs. 7.8%, respectively), no statistically significant difference was found between the two groups ($p=0.207$).

More than half of the population of women in both groups reported that they did not drink alcohol after childbirth. Women with sexual dysfunction were less likely than women without sexual dysfunction to drink alcohol (41.2% vs. 44.9%, respectively). The difference between groups was not statistically significant ($p=0.741$).

Table 29: Patterns of breastfeeding, sleep hours, cigarette smoking and alcohol consumption among postpartum women with and without sexual dysfunction

Sexual Function Breastfeeding, sleep hours, cigarette smoking and alcohol consumption	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Breastfeeding					
No breastfeeding	55	26.3	35	30.2	0.017*
Exclusive breastfeeding	90	43.1	32	27.6	
Partial breastfeeding	64	30.6	49	42.2	
Sleep hours in a 24 hour period					
4-6 hours	94	45	51	44	0.062
7-9 hours	112	53.6	59	50.9	
10-11 hours	3	1.4	6	5.2	
Cigarette smoking					
No smoking	187	89.5	107	92.2	0.207
Occasionally ¹	6	2.9	-	-	
Regularly ²	16	7.7	9	7.8	
Alcohol consumption					
No alcohol consumption	123	58.9	64	55.2	0.741
Light drinking	78	37.3	45	38.8	
Moderate drinking	6	2.9	6	5.2	
Heavy drinking	2	1	1	0.9	

*p<0.05

1 Less than 4 days per week

2 Almost every day

Table 30 presents data on the medical history of postpartum women with and without sexual dysfunction using the chi-square test. The majority of women in both groups reported that they did not use hormonal medicines or any other particular medicines ($p=0.402$ and $p=0.487$, respectively). In addition, more than 95% of women in both groups did not report a history of pelvic operations ($p=0.071$).

Women with sexual dysfunction were more likely than women without sexual dysfunction to have irregular menstrual bleeding during the postpartum period (56.9% vs. 44%, respectively). Irregular menstrual bleeding was a statistically significant ($p=0.026$) risk factor for postnatal sexual dysfunction.

A greater number of women with sexual dysfunction than women without sexual dysfunction reported that they were ill during pregnancy (22.5% vs. 17.2%, respectively) and that they were clinically diagnosed with postnatal depression (14.8% vs. 9.5%, respectively). No statistically significant differences were found ($p>0.05$).

Table 30: Medical history of postpartum women with and without sexual dysfunction

<div> <div>Sexual function</div> <div>Medical history</div> </div>	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Use of hormonal medicines					
No	194	92.8	104	89.7	0.402
Yes	15	7.2	12	10.3	
Use of particular medicines					
Yes	12	5.7	9	7.8	0.487
No	197	94.3	107	92.2	
Pelvic operations					
Laparoscopy	1	0.5	4	3.4	0.071
Bladder prolapse repair	2	1	-	-	
Ovariectomy	-	-	1	0.9	
None	206	98.6	111	95.7	
Regular menstrual bleeding after childbirth					
Yes	90	43.1	65	56	0.026*
No	119	56.9	51	44	
Illness during pregnancy					
Yes	47	22.5	20	17.2	0.317
No	162	77.5	96	82.8	
Being clinically diagnosed with postnatal depression					
Yes	31	14.8	11	9.5	0.227
No	178	85.2	105	90.5	

*p<0.05

The type of sexual activity of postpartum women with and without sexual dysfunction is shown in Table 31 using the chi-square test. Women with sexual dysfunction were more likely than women without sexual dysfunction to report no sexual activity (13.9% vs. 2.6%, respectively) ($p=0.004$). Participants in both groups reported that they practiced mixed methods of sexual activity (49.3% and 58.6%) more regularly than single methods (36.8% and 38.8%).

Women without sexual dysfunction were more likely than women with sexual dysfunction to practice only vaginal intercourse or a combination of 'oral and vaginal sex' and 'oral, vaginal and anal sex'. On the other hand, women with sexual dysfunction were more likely than women without sexual dysfunction to practice only masturbation, only anal sex, or combinations of 'masturbation and vaginal sex', 'masturbation, oral and vaginal sex' and 'masturbation, oral, vaginal and anal sex' ($p=0.004$).

Women with sexual dysfunction were more likely than women without sexual dysfunction to practice masturbation and anal sex as a mixed method. The p value ($p=0.004$) indicates the type of sexual activity was a predictor of sexual dysfunction after childbirth.

Table 31: Type of sexual activity of postpartum women with and without sexual dysfunction

Sexual life			Sexual function		With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
					n	%	n	%	
Type of sexual activity	No sexual activity				29	13.9	3	2.6	0.004*
	Single method	Vaginal sex			73	34.9	44	37.9	
		Masturbation			3	1.4	1	0.9	
		Anal sex			1	0.5	-	-	
		Total			77	36.8	45	38.8	
	Mixed method	Oral & vaginal sex			29	13.9	24	20.7	
		Masturbation & vaginal sex			26	12.4	5	4.3	
		Masturbation, oral & vaginal sex			30	14.4	29	25	
		Oral, vaginal & anal sex			5	2.4	5	4.3	
		Masturbation, oral, vaginal & anal sex			13	6.2	5	4.3	
		Total			103	49.3	68	58.6	

*p<0.05

Table 32 reports on the frequency of sex, resumption of sex and the initiator of sex among postpartum women with and without sexual dysfunction using the chi-square test. Women with sexual dysfunction reported to have less frequent sexual activity than women without sexual dysfunction ($p<0.001$). While 13.9% of women with sexual dysfunction reported that they did not resume sex after childbirth, only 2.6% of women without sexual dysfunction did not. Sexual activity was reported to be more frequent among women without sexual dysfunction as 33.6% and 37.9% of them had sexual activity ‘every second day’ and ‘once a week’, respectively, which was significantly higher than those of women with sexual dysfunction (9.6% and 31.1%, respectively) ($p<0.001$).

The two groups were shown to be statistically significantly different ($p<0.001$) in relation to the time of resuming sex after delivery. Women with sexual dysfunction were more likely than women without sexual dysfunction to resume sex later after childbirth or not to engage in sexual activity. Women who did not have sexual dysfunction resumed sexual activity between 0-8 weeks postpartum.

Women with sexual dysfunction were less likely than women without sexual dysfunction to be the initiator of sex during a sexual activity. Almost half of the population of women with sexual dysfunction reported that their partner was the initiator of sex (49.8%), while only a quarter (25%) of women without sexual dysfunction reported that their partners usually initiated sex. There was a statistically significant difference ($p<0.001$) for the initiator of sex between the two groups.

The majority of women with and without sexual dysfunction were in heterosexual relationships (95.2% and 94.8%, respectively). The number of women in same-sex relationship was too small to be compared to that of women in heterosexual relationship and, therefore, no statistically significant difference was found between the two groups regarding their sexual function ($p=1$).

Table 32: Frequency of sex, resumption of sex and the initiator of sex among postpartum women with and without sexual dysfunction

Sexual function Sexual life	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
Frequency of sex					
No sexual activity	29	13.9	3	2.6	<0.001*
Daily	1	0.5	5	4.3	
Every second day	20	9.6	39	33.6	
Once a week	65	31.1	44	37.9	
Once a fortnight	44	21.1	14	12.1	
Once a month	50	23.9	11	9.5	
Resumption of sex after childbirth					
No sexual activity	29	13.9	3	2.6	<0.001*
0-4 weeks	19	9.1	38	32.8	
5-8 weeks	96	45.9	56	48.3	
9+ weeks	65	31.1	19	16.4	
The sex was usually initiated by:					
The woman	25	12	14	12.1	<0.001*
Her partner	104	49.8	29	25	
Woman and her partner, equally	51	24	70	60.	
No sexual activity	29	13.9	3	2.6	
Sexual orientation					
Same-sex relationship	10	4.8	6	5.2	1
Heterosexual relationship	199	95.2	110	94.8	

*p<0.05

The categorical summed scores of the PHQ-8 and RAS for women with and without sexual dysfunction are shown in Table 33 using the chi-square test. A greater percentage of women with sexual dysfunction than women without sexual dysfunction had scores higher than 10 on PHQ-8, indicating their higher risk of postnatal depression (30.6% vs. 12.1% respectively). Depression was shown to be more prevalent among women with sexual dysfunction than women without sexual dysfunction and the difference between the two groups was statistically significant ($p<0.001$).

The percentage of women with sexual dysfunction, who had scores lower than 4 on the RAS (indicating a lower level of relationship satisfaction) was more than that of women without sexual dysfunction (45.9% vs. 21.6%, respectively). Relationship dissatisfaction was shown to be more prevalent among women with sexual dysfunction and the difference between the two groups was statistically significant ($p<0.001$).

Table 33: Categorical scores of the PHQ-8 and RAS among postpartum women with and without sexual dysfunction

Sexual function Measure's score	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		P value
	n	%	n	%	
PHQ-8					
0-9 (non-depressed or mild depression)	145	69.4	102	87.9	<0.001*
10+ (moderate to severe depression)	64	30.6	14	12.1	
RAS					
Less than 4 (less relationship satisfaction)	96	45.9	25	21.6	<0.001*
4+ (higher relationship satisfaction)	113	54.1	91	78.4	

* $p<0.05$

Table 34 presents data on the mean score and standard deviation of the RAS and each item score among women with and without sexual dysfunction, using the independent samples *t* test. The mean score of the RAS was less than 4 for women with sexual dysfunction (3.8 ± 0.03) indicating that they experienced relationship dissatisfaction, while women without sexual dysfunction reported a mean core of 4.33 ± 0.57 , indicating a higher level of relationship satisfaction. The two groups were shown to be statistically significantly different ($p < 0.001$).

The mean scores for all seven items of the RAS are also shown in Table 34. Women with sexual dysfunction obtained lower scores on all items than women without sexual dysfunction. The women with sexual dysfunction indicated statistically significantly ($p < 0.001$) more problems in the elements of their relationship than did women without sexual dysfunction, including the following: ‘to not to have their needs met by their partners’ (item 1), ‘to be dissatisfied with their relationship’ (item 2), ‘to perceive their relationship worse than that of others’ (item 3), ‘to wish that they had not gotten into the relationship’ (item 4), ‘to not to have their original expectations met within their relationship’ (item 5), ‘to have less love for their partners’ (item 6) and ‘to have problems in their relationship’ (item 7).

Table 34: Mean score and standard deviation of the RAS and each item score among postpartum women with and without sexual dysfunction

Sexual function Measure	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		t (df=323)	P value
	M**	SD***	M**	SD***		
RAS	3.8	0.92	4.33	0.57	5.65	<0.001*
Items						
Met needs	3.5	0.03	4.09	0.79	5.34	<0.001*
General satisfaction	3.65	1.07	4.19	0.83	4.75	<0.001*
Compared to others' relationship	3.83	1.1	4.35	0.74	4.53	<0.001*
Regret of being in the relationship	4.17	1.13	4.67	0.61	4.41	<0.001*
Met expectations	3.47	1.21	4.03	0.96	4.26	<0.001*
Love for partner	4.41	0.93	4.87	0.35	5.12	<0.001*
Problems in the relationship	3.56	1.1	4.14	0.89	4.85	<0.001*

*p<0.05 **M: Mean ***SD: Standard deviation

The mean score and standard deviation of the PHQ-8 and each item score among women with and without sexual dysfunction is shown in Table 35 using the independent samples *t* test. The higher the score, the greater the risk for depression. Women with sexual dysfunction obtained an overall higher mean score on the PHQ-8, compared to women without sexual dysfunction (7.55 ± 6.06 vs. 4.59 ± 3.96 , respectively), indicating that the risk of depression was statistically higher among women with sexual dysfunction ($p < 0.001$).

The mean scores for the eight items of the PHQ-8 are also shown in the table. Women with sexual dysfunction obtained significantly higher scores on all items. The women with sexual dysfunction indicated statistically significant ($p < 0.05$) more symptoms of depression than did women without sexual dysfunction, including the following: ‘to have little interest or pleasure in doing things’ (item 1), ‘to feel down, depressed, or hopeless’ (item 2), ‘to experience sleep problems’ (item 3), ‘to feel tired or have little energy’ (item 4), ‘to have appetite changes’ (item 5), ‘to feel bad about themselves’ (item 6), ‘to have trouble concentrating on things’ (item 7) and ‘to have difficulty with moving or speaking’ (item 8).

Table 35: Mean score and standard deviation of the PHQ-8 and each item score among postpartum women with and without sexual dysfunction

Sexual function Measure	With sexual dysfunction (n=209)		Without sexual dysfunction (n=116)		t (df=323)	P value
	M**	SD***	M**	SD***		
PHQ-8	7.55	6.06	4.59	3.96	-4.72	<0.001*
Items						
Low interest in doing things	0.87	0.93	0.52	0.75	-3.46	0.001*
Feeling depressed/sad	0.83	0.9	0.42	0.59	-4.39	<0.001*
Sleep problems	1.07	1.09	0.74	0.99	-2.68	0.008*
Tiredness/little energy	1.54	1	1.22	0.95	-2.77	0.006*
Appetite changes	1.12	1.04	0.74	0.87	-3.38	0.001*
Bad feelings about oneself	0.93	1.08	0.5	0.74	-3.87	<0.001*
Concentration difficulties	0.76	1	0.31	0.58	-4.43	<0.001*
Moving/speaking difficulties	0.4	0.75	0.12	0.44	-3.62	<0.001*

*p<0.05 **M: Mean ***SD: Standard deviation

Table 36 presents results of multiple logistic regression analysis comparing women with and without sexual dysfunction with respect to variables that predicted sexual dysfunction in postpartum women. Women who had less frequent sexual activity of any kind (fortnightly or less) were more likely to report sexual dysfunction after childbirth (OR = 4.041, 95% CI = 2.199 – 7.427) compared with those with more frequent sexual activity (once weekly or more). Women who were not the initiator of sexual activity were more likely to have sexual dysfunction (OR = 3.78, 95% CI = 2.15 – 6.646) compared with women who initiated sexual activity.

Resuming any kind of sexual activity at nine weeks or later postpartum was shown to be a risk factor for sexual dysfunction (OR = 2.379, 95% CI = 1.201 – 4.711). Furthermore, women were more likely to experience sexual dysfunction during 0-5 months postpartum (OR = 2.358, 95% CI = 1.27 – 4.377) compared to 6-12 months after delivery. Primiparity (OR = 2.534, 95% CI = 1.302 – 4.932), depression (OR = 2.876, 95% CI = 1.318 – 6.276) and relationship dissatisfaction (OR = 2.72, 95% CI = 1.457 – 5.078) were other risk factors for sexual dysfunction.

Table 36: Results of multiple logistic regression analysis comparing women with and without sexual dysfunction with respect to variables that predicted sexual dysfunction in postpartum women

Variable	Crude OR	Adjusted OR	95% CI for OR	P value
Menstrual bleeding				
Yes	1	1		
No	1.685	1.673	0.958 - 2.921	0.07
Frequency of a sexual activity				
Once weekly or more	1	1		
Fortnightly or less	4.905	4.041	2.199 – 7.427	<0.001*
Initiator of sexual activity				
Self	1	1		
Her partner	3.808	3.78	2.15 – 6.646	<0.001*
Resumption of sexual activity after childbirth				
0 – 8 weeks postpartum	1	1		
9 ⁺ weeks postpartum	3.57	2.379	1.201 – 4.711	0.013*
Postpartum time periods				
6 – 12 months	1	1		
0 – 5 month	1.871	2.358	1.27 – 4.377	0.007*
Parity				
Multiparous	1	1		
Primiparous	1.654	2.534	1.302 – 4.932	0.006*
Depression				
No	1	1		
Yes	3.216	2.876	1.318 – 6.276	0.008*
Quality of relationship				
Satisfied	1	1		
Dissatisfied	3.092	2.72	1.457 – 5.078	0.002*

*p<0.05

Chapter 5: Findings of the qualitative component of the study

5.1 Introduction

This chapter reports the responses of postpartum women to open-ended questions about their sexual relationship and also about the influence of pregnancy and childbirth on their sexual function and mental health. Six questions were asked. The number of participants responding to the qualitative questions was less than the total number of women who responded to the quantitative component of the study. There was a seventh question that asked the women if they had any additional comments. The following sections summarise the responses for each of the seven questions. Quotations have been added to present the women's voices. For each question, each quote is from a different woman.

5.2 Findings

5.2.1 Question one

‘What makes you most happy (satisfied) in your sexual relationship with your partner?’

For the purpose of this study, happy and satisfied are used interchangeably. Very few (n=9) women reported that “nothing” made them happy or that they (n=3) had “no idea”.

Some women (n=78) reported that experiencing closeness made them most happy. This included “emotional closeness,” “emotional presence to each other,” “being close,” “emotional connection,” “emotional bond,” “loving connection,” “intimacy,” “affection and love,” “feel desired,” and “friendship and humour.”

Other women (n=60) revealed that it was their husband/partner specifically who made them most satisfied including “his” “understanding,” “caring,” “love,” “trust,” “respect,” “knowing,” “being satisfied [sexually],” and “being attracted to me.” One woman stated:

“His understanding of my lack of interest at the moment really.”

One other woman said:

“He is very caring about how I feel and won’t get mad if things don’t go how he plans.”

Another reported:

“My partner [is] always telling me that I’m gorgeous/sexy.”

Other women (n=29) identified foreplay, oral sex and achieving orgasm (climax) as making them most happy. Women (n=10) also said that it was something about their relationship that made them happy by including “we” or “relationship” specifically in their comments such as “we are compatible and enjoy the same thing” and “we can meet one another’s needs,” “when we both enjoy...,” “we listen to each other’s ...,” “we love and respect...,” “...loving and open relationship,” A few women (n=6) noted that “love” or “love and passion” or “love and attraction” made them most happy (satisfied).

5.2.2 Question two

‘What makes you most unhappy (unsatisfied) in your sexual relationship with your partner?’

For the purpose of this study, unhappy and unsatisfied are used interchangeably. A few reported that “nothing” made them unhappy (n=16), “everything” made them unhappy (n=6) and they had “no idea” what made them unhappy (n=2).

Fifty-two women (n=52) reported that their partner made them unhappy about their sexual relationship. Furthermore, some women (n=20) stated that their partner’s stronger desire and quick ejaculation made them unhappy. Others (n=14) were dissatisfied that their partners considered “only the physical aspect of sex” and that they were there to meet their partners’ needs such as “feeling pressure,” “just thinking about himself,” “... not understanding why I didn’t feel ...,” “... only about him,” “... he bugs me ...,” “being a receptacle ...,” and “my partner being selfish.”

In addition, some other women (n=10) noted that his quick ejaculation made them unhappy and others (n=9) wanted their partners to initiate sex more often. Furthermore, individual women (n=8) reported that the following made them unhappy: “absent from home,” “working hours,” “nagging,” “lack of interest in me,” “no eye contact,” “affair,” “[his] weight,” and “circumcised.”

An additional 57 women mentioned factors about sex that made them unhappy. The most frequently identified one (n=19) was that sex was too fast or rushed with not enough foreplay and they desired more nurturing and sensual touch. Others (n=14) noted that pain or discomfort made them unhappy and others (n=14) noted that the frequency or lack of sex was unsatisfactory.

Furthermore, 40 women identified factors about their sexual response that made them unhappy. For instance, most (n=30) noted their lack of desire or arousal and fewer (n=10) noted their inability to achieve orgasm.

A few women (n=15) reported that the emotional distance or lack of intimacy made them unhappy. Very few women (n=8) noted that the baby's needs interfered with their sexual relationship and fewer (n=5) mentioned that time had an impact.

5.2.3 Question three

'Do you think your last pregnancy affected your sexual function? If yes, in what way?'

One hundred and sixty-three women reported that pregnancy did not impact their sexual function, while 116 women selected "yes", that their sexual function had been influenced. Forty-five women provided comments that specifically related to the nine months of pregnancy. These women reported both positive and negative impacts. Comments included both the pregnancy and the birth and postpartum phase. The comments related to the birth and postpartum phase are reported in the responses to question four.

Eleven women reported that pregnancy had a positive impact on their sexual function and they reported "more interest in sex, easier to orgasm," "greater sex," "higher libido," and "more often." One woman said:

"During pregnancy, I used to really love to have sex every day or few times a day..."

Another woman mentioned:

"I was very horny while I was pregnant and my orgasms were better."

One more woman said:

"Yes, pregnancy hormones made me want sex more often."

Twenty-four women reported negative influences on sexual function during pregnancy. Eight women reported “a loss of desire/libido.” Others (n=5) reported “lots of pelvic and back pain,” “thrush,” “vagina varicose veins,” “serious morning sickness,” and “illness.” Moreover, a few (n=5) women mentioned their husbands were “turned off,” “not interested,” and “did not touch.” Furthermore, being “uncomfortable” was indicated as well as being “unattractive.”

For instance, one woman reported:

“my husband was turned off by my body during pregnancy so I lost confidence ... I had very little desire plus I disliked my body a lot”

5.2.4 Question four

‘Do you think your last childbirth or delivery affected your sexual function? If yes, in what way?’

One hundred and sixty-two women reported no changes to their sexual function after childbirth and 103 provided comments explaining how the delivery of their baby had influenced their sexual function. Five women said that they were “not sure”. Other women (n=98) identified both negative and positive impacts.

Ten women reported positive impacts. They mentioned that childbirth made them feel more positive about themselves, such as “more confident and respectful of my body,” “less inhibited,” “better physically and emotionally,” and “less stuff junking up my head.” Others commented that sex was “more enjoyable,” “better,” and “unhindered.” Two women specifically noted that desire, arousal and orgasm were factors that contributed to better sexual function. One woman who mentioned that hormones made her sexual functions better said:

“My births have been positive experiences and in the days and weeks to follow I feel very sexually aroused and my husband gets oral sex pretty

much every day and sometimes more than once a day. It is great for both of us. He loves receiving and I love giving it. I think God designed sex and childbirth. Both release hormones for bonding and pleasure. ... we experience the most wonderful fulfilling sex."

One other woman reported the following:

"I had a peaceful, amazing, wonderful home birth in a birthing tub, assisted by my husband at all times and it was an amazing experience for both of us. Pushing took less than 4 minutes from start to finish ... and there was no tearing or trauma to the vagina, birth canal or area. My sexual life is now much better than before."

Ninety-two women reported negative impacts. Often the women's comments included more than one factor. Birth related impacts were most often mentioned (n=29). These included the delivery as well as having had a caesarean section, lack of support from birth attendants, twins/large baby, episiotomy/tears and pelvic muscle relaxation. One woman reported the following:

"... Following my second caesarean delivery, my lower abdomen between my pubic bone and navel were completely numb and flaccid, which is beginning to lessen now at 8 months postpartum. I feel that the numbness in my lower abdomen extends somewhat below the pubic bone, deadening my clitoral sensation which makes it difficult to orgasm."

Another woman reported:

"The episiotomy hurt so much the first 6 months, every time we tried to have sex it was extremely painful for me. I think that caused me to not want it at all and think I was damaged permanently."

One other woman said:

“It was a very traumatic birth ... My epidural didn’t work so I felt everything! I was on a drip so it was more painful anyway... I ripped everywhere, had a vacuum delivery and lost too much blood. I also had placenta stuck! Overall, it has completely killed my sex life!”

The second most frequently mentioned negative impacts (n=27) were a combination of lack of desire, arousal, lubrication and orgasm. Painful intercourse (n=8) was also reported to have had a negative impact on sexual function. Women described the pain as “vaginal pain,” “occasional pain,” “soreness,” “hurts,” “too painful,” and “extreme discomfort.” In addition, breastfeeding (n=7) was reported to negatively impact sexual function of women. For example, one woman said:

“... Since having children my libido has been nearly non-existent. I practice extended breastfeeding and am still occasionally breastfeeding my 3 year old son in tandem with my 8 month old daughter. ... I feel certain that it is influenced by hormones as my libido and sexual function have only just begun to return now that my period has returned. ...”

Moreover, a few women (n=6) reported that their last childbirth left them tired or fatigued, which had a negative impact on their sexual function. For instance, one woman said:

“This has just made me realise that I’m not interested in sex pretty much because I’m worn out! I’d quite like a bit of time to myself with my partner!”

5.2.5 Question five

‘Do you think that your last pregnancy affected your mental health? If yes, in what way?’

One hundred and ninety-three women mentioned that their mental health had not been influenced by pregnancy. Of the 80, who reported “yes” that they experienced impacts on their mental health, 56 provided relevant comments. The comments reported both positive and negative impacts.

There were 10 women who reported positive impacts. These included “improved,” “made me happier,” “beneficially,” “learning,” “better person overall,” “spiritual development,” “more relaxed and centred,” “clearer in mind,” “matured,” “positive thinking,” and “empowering.” One woman stated:

“It made me happier. I felt more loved and in love with my husband. This caused my mind to be at ease and for me to relax.”

Others (n=46) reported that pregnancy had a negative influence on their mental health and some women identified more than one negative influence. Depression was most frequently identified by 22 women. Stress (n=6), anxiety (n=6) and hormone fluctuation (n=6) were also reported as negative changes. Other negative emotional impacts that were reported by a few (n=4) women included “overwhelmed,” “less able to cope,” “insomnia,” “mood swings,” Other individual women (n= 6) mentioned “lonely,” “traumatised,” “lose my freedom,” “lack of control,” “lowered self-esteem,” and “distracted and spacey.”

A few individual women (n=7) reported specific pregnancy related factors that contributed to the negative changes in mental health. These included “threatened miscarriage,” “unplanned pregnancy,” “weight gain, blood pressure and lack of mobility,” “relationship strains,” and “abusive partner.” For example one woman reported:

“I had some bleeding and a ‘threatened miscarriage’ early on in the pregnancy. My activity level was greatly reduced, which had a tremendous impact on my active lifestyle, not to mention I was worried about losing the baby.”

5.2.6 Question six

‘Do you think your last childbirth or delivery affected your mental health? If yes, in what way?’

One hundred and eighty-eight women reported that childbirth or delivery had not influenced their mental health status, while 84 women experienced changes, either negative or positive, in their mental health status. Of these women, 76 provided relevant comments.

There were 23 women who reported positive impacts. These included “done very well emotionally postpartum,” “more comfortable and empowered,” “more confident in myself,” “empowered,” “improved my mental health,” “more mental confidence and pride,” “feel like I could do anything,” “happy,” and “ecstatic.” One woman stated:

“I feel more confident in myself. I felt much empowered in my child birth. And when I go through tough times in motherhood I look at the situation and say if I overcame and conquered in birth then I can overcome and conquer in anything that comes my way.”

There were 53 women who reported negative impacts on their mental health. Of these women, 24 reported delivery related issues, which included emergency caesarean section and traumatic birth. One woman reported:

“I was devastated by the C-section. My doctor wanted to induce me at 39 weeks over concerns that my baby was too large This scared me so I agreed to it. The induction failed ... and since they had broken my

water, I was forced to have a C-section. ... I was angry at myself for going through with the induction and angry at the doctor for scaring me into it. It's an experience that I can never get back."

Another woman said:

"I had birth trauma from so much scary pain. I think it did something to me but I can't describe what. Post-traumatic stress disorder? I wanted to jump out of my bedroom window (2nd story) and end it all in several moments the pain was so much. I feel scarred (sic) that I had those thoughts. Scary!"

The second most frequently mentioned negative impact (n=15) was "depression," "postnatal depression," and "postpartum depression." Individual women (n=11) commented that they experienced "[being] on the edge," "lots of anxiety," "more emotional," "more anxious and less confident," "scared," "distracted and spacey," "very stressed," and "a bit crazy."

5.2.7 Question seven

'Do you have any other comments?'

Women were asked whether they had additional comments. Forty-five women responded to this question with relevant comments. A few (n=9) women provided positive feedback including "thank you," "very interesting," "opened my eyes," "good on you," and "made me realise...". Less (n=5) women commented that "being a mother," "the lack of time," and "fatigue/tired/exhaustion" were problematic. Other (n=4) women made note of the following: "sex has been good...", "...made our relationship better," "best most satisfying sexual relationship," and "sex has gotten better for me."

There were two comments about medical care. One woman said “there is so little help from people who understand birth trauma.” Another woman reported:

“Medical professionals should understand what lasting damage they leave a woman with emotionally. If I had the choice of medical intervention or not being around any longer in hospital, I would have chosen the latter.”

The lack of information was evident when one woman said:

“I'm not sure if it's normal to experience pain and discomfort during sex for months following birth. I've never heard much about it or what could cause it.”

Another woman commented on the possible misunderstanding of pregnancy. She reported:

“I think everyone seriously underestimates the changes that will happen to your body after being pregnant, everyone talks about during the pregnancy and straight after but nothing about months and years down the track how it can really change your body so much. In my case for the worse, ...”

A few individual women (n=3) acknowledged the transient nature of this period of life and reported that “... this will pass as babies grow very quickly ...” and “... there's light at the end of the tunnel”. One woman reported:

“Its life ... Would I change being a mother? Hell no- those cute smiles and hugs that you get- NOTHING beats that. They are what I look for on the long nights of no sleep, of sick &/or upset baby. Would I change anything? No, because the entire experience has made & continues to make me stronger....”

Other factors that were identified as impacting sexual function and mental health were the following: (a) delivery/birth experiences, (b) characteristics of the baby such as sleeping and breastfeeding patterns, (c) family composition, (d) available support, (e) physical health, (f) return of menstruation, and (g) domestic violence.

Two women suggested that the study could have asked about “if it is first or second marriage” and “body image/weight gain/scars.”

Chapter 6: Discussion, concluding comments, recommendations and research limitations

To the knowledge of the researcher, the present study was the first comprehensive and integrated study in Australia in which the relationship between sexual function, depression, relationship satisfaction, parity and other factors of life of postpartum women during the first year postpartum was investigated. The results from the demographic questions and three standardized questionnaires were presented in Chapter 4 and the findings from the seven open-ended questions were reported in Chapter 5. This chapter discusses the quantitative results and the qualitative findings and follows with a general discussion. The next sections are concluding comments and recommendations. The final section is research limitations.

6.1 Discussion: Quantitative results

The main aim of the quantitative component of the study was to explore sexual function of postpartum women during the first year after childbirth and to evaluate the association with depression, parity and relationship satisfaction. A secondary aim was to identify the contextual factors of demographics, obstetrics and gynaecological history, baby's characteristics, medical history and sexual life in the occurrence of sexual dysfunction of postpartum women during the first year after childbirth. Based on the literature review, this appears to be the first study in Australia known to the present researcher that investigated women's postpartum sexual experience with such a comprehensive approach.

6.1.1 Sexual function

Results of the study showed that 209 out of 325 women (64.3%) experienced sexual dysfunction during the first year after childbirth. In addition, sexual desire disorder (81.2%), sexual dissatisfaction (70.5%), orgasm problem (53.5%) and sexual arousal disorder (52.2%) were the most prevalent types of sexual dysfunction, while lubrication difficulties (43.4%) and sexual pain disorder (39.4%) were the least reported. Although there is no published study of the prevalence of sexual function

of Australian women during the first year after childbirth, other studies in Australia have provided data on the prevalence of sexual dysfunction of women of reproductive age. A study by Najman et al. (2003) reported that 60% of Australian women experienced at least one form of sexual dysfunction and Richters et al. (2003) showed that sexual desire disorder (54.8%), orgasm difficulties (28.6%), sexual dissatisfaction (27.3%) and sexual pain (20.3%) were the most prevalent types of sexual dysfunction reported by Australian women. In comparison to these two studies, overall sexual dysfunction of women was higher in the present study. This study also showed that sexual desire disorder, orgasm difficulties and sexual dissatisfaction were more prevalent than other types of sexual difficulties among the general population of Australian women. The higher rate of sexual problems among participants in the present study suggests that Australian women are at a high risk of sexual dysfunction after childbirth.

A score of 26 or less on the FSFI indicates sexual dysfunction. Results of the present study showed that the mean score was 21.81 ± 8.42 for primiparous women and 21.57 ± 9.28 for multiparous women, which was lower than the score (26.8 ± 7.1) reported by Baytur et al. (2005) for nulliparous women in Turkey. A Canadian study by Chivers, Pittini, Grigoriadis, Villegas and Ross (2011) showed that 65% of postpartum women obtained a mean score of 23. Thus, the mean score among Australian postpartum women in this study was lower. The prevalence of sexual dysfunction during the postpartum period has varied from 22.2% to 91.3% (Acele & Karaçam, 2012; Barrett et al., 2000; Williams, Herron-Marx & Carolyn, 2007). The prevalence of 64.3% reported in the present study can be explained by the variation in population characteristics, traditional beliefs and cultural issues, factors that have been shown to significantly impact the prevalence of sexual dysfunction (Naldoni et al., 2011; Safarinejad, 2006).

Primiparous and multiparous women did not differ significantly according to the rate and mean scores of the FSFI for sexual dysfunction, PHQ-8 for postnatal depression and RAS for relationship assessment. The sexual function of women during the first year after childbirth was significantly associated with the following: number of children at home, breastfeeding activity, experiencing regular menstrual cycles, usual

sexual activity, frequency of sex, time of resumption of sex after delivery, initiator of sex, depression and lower relationship satisfaction.

6.1.2 Risk factors of sexual dysfunction

Multiple logistic regression analysis identified risk factors for postpartum sexual dysfunction for women in this study as follows: 'less frequent sexual activity', 'late resumption of sex after childbirth', 'not being the initiator of sex', '0-5 months after delivery', 'primiparity', 'depression' and 'relationship dissatisfaction'. Women were at a higher level of risk if they had less frequent sexual activity (fortnightly or less), were not the initiators of sex or resumed sexual activity after nine weeks following delivery. The risk of sexual dysfunction during 0-5 months postpartum was higher than that of 6-12 months after delivery.

The multiple logistic regression analysis showed an association between the factors impacting sexual dysfunction after delivery, which corroborated results of previous studies. De Judicibus et al. (2002) showed that women, who suffered more severe forms of postpartum depression, were less interested in participating in sexual activities. In the study by Bancroft et al. (2003), women, who identified themselves in good mental health, were less likely than women with low self-rated mental health to report distress about their sexual relationship. Morof et al. (2003) reported that women without symptoms of postpartum depression resumed sexual activity earlier than depressed women within the first six months after childbirth. Moreover, Acele and Karaçam (2012) reported that women who were dissatisfied with their marital relationship had a higher rate of sexual problems during the first year after childbirth. Although Cyranowski et al. (2004) reported contradictory findings that depressed and non-depressed women were not different in terms of sexual desire, their study failed to inquire about the quality of the relationships.

Sexual function and parity

In the present study, primiparity was a risk factor for sexual dysfunction and the rate of sexual dysfunction was lower among multiparous women than primiparous ones. There was an association between having two or more children at home and a lower rate of sexual dysfunction. Women with two or more children were less likely to experience sexual dysfunction and among them, the risk of sexual dysfunction decreased with the decrease of the number of children. An explanation for this could be the higher rate of perineal tears and episiotomy reported by primiparous women. Other research has shown that women with perineal trauma were at greater risk of sexual problems than women with an intact perineum (East et al., 2012; Rathfisch et al., 2010). Also, Rao and Demaris (1995) reported that having only one child at home could require more energy, time and attention, and provide parents with less privacy. In families with more than one child, children can participate in group games and play with each other. In addition, older children can supervise the younger ones. Therefore, their parents could devote more time to each other and pleasing one another (Rao & Demaris, 1995).

Sexual function and postpartum time periods

The sexual function of women in the present study improved between 6-12 months compared to 0-5 months period immediately after childbirth. This was in accordance with previous studies (Rogers et al., 2009; Xu, Yao, Wang, Zhou & Zhang, 2003). Connolly et al. (2005) reported that the rate of sexual dysfunction was higher during the first weeks after delivery and decreased with additional time. However, Acele and Karaçam (2012) reported that an increased risk of sexual problems paralleled an increase of time after childbirth. Their dissimilar findings could be due to the variation in the sociocultural characteristics of their participants or to factors associated with adapting to new motherhood role. In addition, the difference between the results of the present study and that of Acele and Karaçam (2012) could be explained by the rate and severity of depression and relationship dissatisfaction during the two time periods after childbirth. In the present study, the rate and severity of postnatal depression and relationship dissatisfaction were both higher during 0-5 months compared to 6-12 months postpartum. Furthermore, the rate of depression

and relationship dissatisfaction was higher among women with sexual dysfunction than women without sexual dysfunction. In the study by Fauconnier et al. (2012), postpartum sexual problems at one year after delivery were not related to the mode of delivery, perineal tears or other factors, but were significantly associated with existing sexual problems before pregnancy. They reported that prolonged postnatal sexual problems could be a continuation of pre-pregnancy sexual dysfunction. Therefore, the increasing rate of sexual problems during the first year after childbirth, as reported by Acele and Karaçam (2012), could be due to the women's pre-existing sexual dysfunction.

Sexual function and breastfeeding

Breastfeeding women in the present study reported a higher sexual dysfunction than non-breastfeeding, a result similar to previous studies by De Judicibus and McCabe (2002) Haugen et al. (2004) and Khajehei et al. (2009). Changes in the sexual function of women after childbirth may be explained by the following: Women who breastfeed experience a substantial alteration in hormone levels and lactating women have higher levels of prolactin that result in a decline of androgens and oestrogen. The decrease of androgen has been associated with lower desire for sex (Warnock, 2002). Lower oestrogen levels have resulted in a higher level of vaginal dryness and dyspareunia at 6 months after childbirth (Signorello et al., 2001). Lactation may increase the sensitivity of the breasts. Some women feel uncomfortable having their breasts touched by their partner during foreplay and this may make breast stimulation unpleasant and undesirable for women as Leeman and Rogers (2012) reported. In contrast, Moel et al. (2010) reported that sexual function was not associated with breastfeeding. The different results may be explained by the following. Oxytocin is released in great amounts when a baby suckles the nipple. Higher levels of oxytocin have had a positive influence on the mood and sexual arousal of women (Avery, Duckett & Frantzich, 2000). In addition, an increase of the sensitivity of the breasts has been reported by Leeman and Rogers (2012) to result in better erotic response and body image of some other women and result in better sexual function after childbirth. The different results can be explained by the two mechanisms (low levels of androgens and oestrogen and high level of oxytocin). Some women are sensitive to the decrease of androgen and oestrogen and experience sexual dysfunction, while

others are sensitive to the increase of oxytocin and experience improved sexual function during breastfeeding

6.1.3 Postpartum depression

In the present study, 24% of the women had postpartum depression with the rate significantly higher among multiparous compared to primiparous participants ($p>0.05$). The rate of depression was higher among postpartum women in this study than those reported in other countries. A North American study (Horowitz, Murphy, Gregory & Wojcik, 2009) reported that 19% of women experienced postpartum depression based on the responses to a self-administered questionnaire. A study in Norway by Glavin, Smith and Sørnum (2009) reported that 10.1% of postpartum women suffered depression and noted that primiparous women were at a greater risk of postnatal depression than multiparous ones. Furthermore, a Japanese study showed that 13.8% of women experienced postnatal depression at 2 months postpartum (Miyake, et al., 2011). The variation in results could be due to the use of different tools to measure symptoms of depression. In addition, cultural factors could have substantial impact on women's beliefs and could influence the occurrence of postpartum depression (Bina, 2008).

Risk factors of postpartum depression

In the present study there was a significant association between postpartum depression and 'low level of education', 'sexual dysfunction' and 'relationship dissatisfaction'. Perlman et al. (2007) also reported a significant association between depression and sexual dysfunction and Goyal, Gay and Lee (2009) also reported a significant association between depression and poor relationship satisfaction. In this present study, low maternal education was a risk factor for postnatal depression, consistent with previous studies. A Canadian study by Davey, Tough, Adair and Benzies (2011) reported that a lower educational level was a risk factor for major depression after childbirth. In addition, the study by Figueira et al. (2010) revealed that the risk of postpartum depression increased with a decrease in the level of education. According to Britton (2008), women who had low educational levels knew less about how to develop the maternal role and were less capable of managing

the needs of the baby and the expectations of the partner and other family members. Also, Goyal, Gay and Lee (2010) reported that low educational level was associated with low socioeconomic status which has been shown to be a risk factor for postnatal depression.

6.1.4 Relationship satisfaction

The total rate of relationship dissatisfaction among the women in the present study was 37.2%. Primiparous women reported higher levels of relationship satisfaction than did multiparous ones ($p>0.05$). Lower annual income, being in a heterosexual relationship, 0-5 months postpartum, sexual dysfunction, clinical diagnosis of depression and the experience of depression based on the scores of the PHQ-8 were identified as risk factors that increased the possibility of relationship dissatisfaction during the first year after childbirth.

Other research has reported the association between income and relationship satisfaction. Vemuri, Morgan, Wilson and Burch (2011) reported that lower income had negative impacts on a couple's relationship. Dion (2005) noted that couples with lower financial status experienced more relationship issues and were at greater risk of marital conflict and dissatisfaction.

Relationship satisfaction and postpartum time period

In the present study, the level of relationship satisfaction was lower during 0-5 months after childbirth compared to 6-12 months postpartum. This supports the results of the earlier study by Doss, Rhoades, Stanley and Markman (2009), which reported that couple relationships deteriorated following childbirth. Lower levels of relationship satisfaction during early months after childbirth for women could have been due to difficulties with adjusting to a new motherhood role, coping with postpartum physical and emotional changes and ensuring the wellness of the baby.

6.2 Discussion: Qualitative findings

A few participants reported that they were happy that women's issues around sexuality, childbirth and postpartum health had been acknowledged by the survey. One mentioned that the survey opened her eyes to how down and wrong things really were and that she needed to seek help.

Some of the women reported that after childbirth they regained a new self-confidence as a woman. Although they mentioned that their sex drive was different from pre-pregnancy, their relationship with their partner had changed, they were not happy with many stretch marks as well as baggy belly skin and weight gain, they felt that they gained a new perspective of themselves and reported that they had a mental 're-birth' and awakening during pregnancy, labour and afterward. These findings support a previous study indicating that some women considered the childbirth-induced changes to be empowering and that they had positive experience of motherhood (Ngai, Chan & Holroyd, 2011). Although not evaluated in the present study, previous research has shown that women's ability to adapt to a new role and their attitude towards pregnancy-related changes and birth-induced alterations were strongly associated with cultural beliefs and attitude (Amankwaa, 2003; Ngai et al., 2011), which might have been the case for participants in the present study.

Despite some women reporting better mental and sexual function during and after pregnancy, overwhelmingly women reported that their sexual function and mental health were negatively influenced by pregnancy and childbirth. The following factors were reported as the indicators of the sexual function and mental health status of women during and after pregnancy: pregnancy-related issues such as unwanted pregnancy, threatened abortion, morning sickness, mood changes, pain and hypertension; birth-related issues such as perineal trauma, caesarean section and lack of support from the caregivers; postpartum issues such as anxiety, depression, breastfeeding, hormonal changes, role conflict, fatigue and physical health problems; relationship issues such as being in an abusive relationship and having a non-cooperative partner; child-related issues; and challenges with in-laws.

Emotional intimacy, feeling of closeness, affection and love were reported to be main features of a satisfying sexual relationship. Pleasing the partner as well as being satisfied by the partner, both emotionally and sexually, were reported to be indicators of a happy sexual relationship. On the other hand, a lack of emotion and love within the sexual relationship, the unwillingness of the partner to please the woman, child related issues and physical complaints were the main factors that were reported to negatively affect sexual relationships of women in the study and make them unhappy.

According to the comments by women, it seems that childbirth may not be a sole factor affecting the mental and sexual health of women and that "becoming a mother" may play a more significant role. Parenthood requires mothers to spend more time taking care of the newborn, which leaves the mother with less time to look after herself. Previous research has shown that being a mother makes many women "feel isolated, alone and depleted rather than nurtured and supported" (Barclay, Everitt, Rogan, Schmied & Wyllie, 1997, p. 727). In addition, an Australian survey (Williamson, McVeigh & Baafi, 2008) used a mixed research method to assess the sexual life of couples in Australia. Findings showed that pregnancy and childbirth affected the sexual function of most of the couples who participated in the study, and it, in turn, influenced their relationship in a negative way. Factors such as feeding the baby at night, tears in perineum, tiredness, dedicating more time to the baby and less time to the partner and loss of desire for sex were mentioned as interfering with a couple's sexual life and relationships. In the study by Williamson et al., only one couple declared that their sexual desire and activity increased after childbirth and their relationship became stronger, as they had abstained from sex during pregnancy due to the fear of hurting the baby and they looked forward to resuming sex after delivery. Results of the study by Williamson et al. (2008) were supported by reports of a previous study in which childbirth had deteriorative effects on couple's relationships (Avery et al., 2000).

Adapting to their new role as parents was an issue of concern especially to new mothers. Taking care of the newborn was followed by tiredness, lack of sleep and less free time for the mothers. Consequently, women wanted to sleep or spend some

time to look after themselves in their limited free time instead of having sex, conflicting at times with the partner's sexual desire with a consequent negative impact on their sexual life. This finding supported reports of previous research indicating that adapting to their new role was difficult for some women and had negative changes to women's sexual function (Olsson, Lundqvist, Faxelid & Nissen, 2005). Research has suggested that the role conflict might have been induced by a mismatch between a 'prior expectation from being a mother' and the 'real experience of motherhood' (Luyben, Kinn & Fleming, 2011).

Comments by the participants showed that women expected more support from their partners, family members and caregivers during the postpartum period. Women with non-cooperative partners reported that they were not in the mood most of the time and were not interested in sexual activity with their partners. This finding is supported by previous research indicating that lack of support from the partner can lead to postpartum depression (Iles, Slade & Spiby, 2011). It has also been demonstrated that mothers who were strongly supported by their partners during pregnancy were less likely to experience emotional distress after childbirth (Stapleton et al., 2012). This association has been shown to be mutual. Not only could the level of support from the partners affect the mental health of women after delivery, symptoms of depression could predict the quality of couples' relationships during the first year after childbirth (Lilja, Edhborg & Nissen, 2012).

Findings of the present study showed that although depression might be a consequence of sexual problems, it could be a cause of sexual difficulties. Receiving little or no help from their partners to do daily tasks made the women feel overwhelmed or depleted which was reported to result in lack of interest in sex. Women reported that they needed to connect emotionally, mentally and even intellectually before they could connect sexually. As reported, women needed to be assured of being loved and appreciated outside the bedroom; they wanted their life together to be the focus, not just the sex life. Emotional connection and being loved have been reported to be determinants of sexual arousal in some women and an inclination towards keeping sex and love separate has been documented in the literature (Laan & Everaerd, 1995; Read, 1995).

Some of the women in the study reported that they were looking forward to having a natural vaginal birth, but instead they ended up with caesarean section. The women had undergone caesarean section either due to complications with the unborn baby, or improper diagnosis by the doctor, which resulted in mental and sexual health problems during the postpartum period. Prior research in Australia showed that a minority of Australian women requested caesarean sections and their main reason was concerns towards the well-being of the baby (S. Robson, Carey, Mishra & Dear, 2008). Women reported that if they had had the choice of medical intervention or not, they would have chosen the latter. Although the women in the present study reported being happy with the safety of the baby by having a caesarean delivery, they wished that the medical professionals would have understood the depth of emotional damage that the mothers were left with. This finding supported a previous study in which an association between caesarean section and postpartum blues was reported (Gonidakis, Rabavilas, Varsou, Kreatsas & Christodoulou, 2007).

Women were concerned about early physical changes after childbirth. This suggests that some women did not acknowledge alterations of the body due to pregnancy, childbirth and breastfeeding as a form of development. Instead, the women regarded it as a negative aspect of motherhood and did not feel happy with their new body image, which had negative impacts on their mental health and sexual function. These findings have previously been reported in other studies (Downs, DiNallo & Kirner, 2008; Mickelson & Joseph, 2012). The attitude of women towards having a perfect body after childbirth needs to be modified early during pregnancy and they should be informed of the natural adjustment of women's bodies during and after pregnancy. Not only women, but also their partners need to be informed of these changes and prepare themselves for the upcoming change.

Many women reported that underestimating future physical and physiological changes in the body happening after childbirth was another issue of concern. Having constant pain, improper functioning of organs, lack of confidence with deteriorated mental health and sexual function after one year postpartum put a strain on women's relationships. These changes were not generally acknowledged during routine visits with the doctors and the health care providers seemed reluctant to talk about the

issues. According to the findings of the present study, it seems that everyone talks about the changes during pregnancy and straight after, but nothing about months and years down the track. Women reported that they had encountered unrealistic expectations to be "back to normal" in unrealistic time frames and had not taken into consideration that postpartum complications may be sequelae of previous pregnancy and childbirth and, therefore, recovery from changes may take longer. Some women may need limited or extensive surgery to correct the problems induced by the childbirth while others may need help from physiotherapists to resolve their issues (Nemeth & Ott, 2011; Nygaard et al., 2008; Olsen, Smith, Bergstrom, Colling & Clark, 1997).

Women reported that they did not receive professional support, especially from the caregivers and midwives as the key individuals who were expected to understand birth trauma during and after delivery. These findings supported reports of previous research indicating that women need professional advice and sensitive counselling not only prior to pregnancy, but also during and after pregnancy, in order to be able to maintain satisfactory sexual and mental health after childbirth (Olsson et al., 2005).

6.3 General discussion

The quantitative results were supported by the qualitative findings. More than half of the women who participated in the quantitative part of the study reported that they experienced sexual dysfunction (64.3%), a finding supported by the responses to the qualitative questions in which many women commented about sexual problems during the postpartum period.

According to the quantitative responses, sexual desire disorder, sexual dissatisfaction, orgasmic problem and sexual arousal disorder were reported to be the most prevalent types of sexual problems among postpartum women. This finding was in accordance with the qualitative responses indicating that women lacked desire for sex, had lubrication difficulties and orgasm dysfunction after childbirth.

Results of the quantitative component showed that sexual function of postpartum women was associated with breastfeeding, hormonal imbalance, less frequent sexual activity, not being the initiator of sex, the first five months after delivery, primiparity, depression and relationship dissatisfaction. The associations were supported by responses given to the qualitative questions.

The quantitative part of the study showed that 56.5% of women who experienced sexual dysfunction had two or more children at home. This was supported by selected findings of the qualitative component in which women mentioned experiencing fatigue along with having more than one child as being associated with sexual dysfunction.

The quantitative part of the study revealed that low level of education, sexual dysfunction and relationship dissatisfaction were risk factors for postpartum depression. In addition, the rate of postnatal depression was higher among multiparous women than primiparous ones. These findings were corroborated by responses to the qualitative questions.

Regarding the risk factors of relationship dissatisfaction during the first year after childbirth, the quantitative study revealed that lower annual income, first five months after childbirth, sexual dysfunction and depression affected the quality of the relationship. Findings of the qualitative part of the study supported these results and reported that challenges with the new life during the first months after childbirth as well as sexual problems and symptoms of depression affected women's relationships with their partners.

6.4 Concluding comments

The present study identified the contribution of different factors on postpartum sexual dysfunction, depression and relationship dissatisfaction. The study generated new knowledge to increase the understanding of women's life after childbirth.

Since postpartum sexual dysfunction and depression can affect postpartum women and their relationships, the results of this study have important implications for those who assist pregnant and postpartum women including doulas, midwives, nurses and doctors. In addition, there are implications for education and counselling professionals as well as health promotion professionals.

Women's sexual function can be dramatically disturbed during pregnancy and after childbirth. However, they rarely refer to professionals to seek help, advice and treatment. This may be due to their lack of knowledge on the issue or because of their shyness and embarrassment. Since sexual activity is an inseparable part of human life, it is important to assess sexual function of women during pregnancy and after childbirth as its impairment has obvious impacts on the quality of life of women, their families and society. Sexual function of women needs to be taken into account during antenatal and postnatal visits in order to address any sexual difficulties and to promote their quality of lives.

The information obtained from this study may enhance the knowledge and awareness of practitioners and clinicians and encourage them to talk openly with women during routine antenatal and postnatal follow-up and education. The primary care services should aim to consider how the sexual and mental health status of women changes during and after pregnancy with an integrated approach to improving their overall wellness. Routine assessment of sexual function, mental health and quality of relationships is needed not only during the first months postpartum but throughout the first year and beyond. The improvement of mental health status and quality of relationships among participants during the 6-12 month postpartum period could lead to better sexual function in this period.

Educational classes can also be conducted by inviting pregnant and postpartum women and their partners, with the aim being to inform them about changes in sexual function, mental health and quality of relationships during and after pregnancy. This can, in turn, help them to pursue more effective coping strategies. In addition, peer support groups can provide postpartum women with support and guidance to help

them find answers to their questions, resolve their issues and get more involved in community activities (Doornbos, Zandee, DeGroot, & Warpinski, 2013).

In spite of the high prevalence of sexual problems and postpartum depression (Brown & Lumley, 2000; Rubertsson, Wickberg, Gustavsson, & Rådestad, 2005) these issues are infrequently addressed during routine postnatal visits (Olsson et al., 2011). Unless the woman tends to express concerns and seek help and advice, health care practitioners are unlikely to talk about sexual problems after childbirth due to embarrassment, a lack of training, a lack of knowledge and/or lack of time (Olsson et al., 2011). Further, since sexual problems and postpartum depression can result from various confounding factors, sexual and relationship counselling practitioners often take sexual problems and postpartum depression for granted (Lamont & Hamilton, 2012). Consequently, the findings of the present study can be used to develop new approaches applicable in sexual and relationship counselling for postpartum women. Postnatal visits should not be limited to a physical health check of the mother and baby but include an evaluation of any sexual and mental health problems being experienced by the mother. In addition, psychologists, nurses and midwives could be trained to develop the skills for addressing and discussing sexual and mental health problems after childbirth. Training should include strategies for providing active client-centred counselling with an open atmosphere, to enable postpartum women to freely express their concerns, needs and expectations (Edvardsson et al., 2011). Moreover, these potential confounding factors need to be investigated during postnatal visits in order to address sexual and mental health problems and to promote the quality of life of the women and their families.

The National Perinatal Depression Initiative (NPDI) (Australian Health Ministers' Advisory Council, 2008) was launched by the Australian government in 2008 in order to provide routine screening for depression during pregnancy and after childbirth in order to improve prevention and early detection of antenatal and postnatal depression for childbearing women. Research has shown that “the implementation of the NPDI is uneven among Australian maternity hospitals. Little is known about perinatal mental health screening practices in the private sector and hospitals with <1000 births annually” (Fisher, Chatham, Haseler, McGaw, &

Thompson, 2012, p. 559). In addition, no routine screening of sexual problems and relationship dissatisfaction is currently performed at public maternity hospitals or in the private sector in Australia. According to the results of the present study, 64%, 24% and 37.2% of women experienced sexual problems, depression and relationship dissatisfaction, respectively, during the first year after childbirth. The results can be used to support the implementation of an ongoing and widespread routine screening of women after childbirth for sexual problems, depression and relationship dissatisfaction. In addition, the findings can provide supporting evidence for future health promotion plans and strategies.

6.5 Recommendations

A number of key issues emerged from the present study indicating a need for further research. The first recommendation addresses the research design. The present study was a cross-sectional study that recruited a non-randomised sample of postpartum women across Australia. In order to allow generalisation to the population of postpartum women in Australia, a future study should consider a random sampling approach such as systematic random sampling, simple random sampling, stratified random sampling or cluster random sampling (Levy & Lemeshow, 2008).

In addition, Aboriginal and Torres Strait Islanders were not included in the present study due to ethical concerns. Further research is needed to address the sexual health issues and needs of this group of people.

The number of lesbian women who participated in the study was considerably less than heterosexual women making any statistical analysis and comparisons impossible. Further research is needed to understand the depth of sexual health concerns of postpartum lesbians.

As the present study did not explore the sexual experience of fathers or partners during pregnancy and in the first year after childbirth, future studies should do so. In addition, the present study failed to ask about cultural factors affecting postpartum

women during the first year after childbirth and this needs to be addressed in the future research.

Moreover, the present study did not investigate the association between the length and duration of relationships, being married more than once, cohabiting, de facto relationships, stable non-married relationships and sexual function and depression in postpartum women. Future studies should address this gap in knowledge.

Another recommendation concerns studying postpartum women with children from previous relationships who might find their sexual and mental health status and quality of relationships affected by dynamics associated with the stepfather. This issue needs to be addressed in the future research.

Also, abusive relationships were not explored in the present study. Research has shown that 27.7% of Australian women are in abusive relationship and among them, 77.3% experience mental disorder (S. Rees et al., 2011). Thus, future research should assess the sexual and mental health status of postpartum women who are in an abusive and violent relationship. Further studies should also evaluate the type and adequacy of support that postpartum women in abusive relationships receive from community services.

Last but not least, women who completed the qualitative component of the study said that they either didn't seek or didn't want to seek professional help. Future studies should explore whether women have access to such support or services, why women do not seek professional help and what would encourage them to seek help.

6.6 Research limitations

Prior to closing this section with recommendations for future studies, it is useful to identify the limitations of the present study. The first limitation is that this was a cross-sectional study in which random sampling did not occur. Therefore, the participants were not representative of the population of postpartum women in Australia and the results of the study cannot be generalised to the entire population of

postpartum women across Australia. However, as the calculation of the sample size was based on the population of postpartum women in Australia, the results are noteworthy and important.

Because participants were asked to complete the questionnaire online, this excluded those who had no access to a computer or who were computer-illiterate. In addition, the language of the survey was English and this excluded non-English speaking women.

The last limitation is that there were few responses from women in same-sex relationships. Although the researcher sought help regarding recruitment of lesbian mothers, only sixteen women in same-sex relationships participated. Therefore, the findings of the study cannot be generalised to the population of lesbian women in Australia.

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Every reasonable effort has been made to acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

Appendices

Appendix A: Flyer



**PARTICIPANTS NEEDED TO TAKE PART
IN A STUDY ON
SEXUAL FUNCTION AFTER CHILDBIRTH**

Have you given birth to a baby in the past year?

If so, we invite you to participate in a unique, online research study sponsored by Curtin University.

Who can participate?

In order to be eligible to enter this study, you need to meet all of the following conditions:

- a) you must be between 16 and 40 years old;
- b) you must have given birth 0-12 months ago at 37th week or later of pregnancy;
- c) you must currently have a regular sexual partner;
- d) you must not be currently pregnant.

Should I provide my name and contact details?

The survey is confidential. You will not be asked to provide your name or any other identifying information.

How long does it take to fill in the questionnaire?

The questionnaire will take about 20-30 minutes to complete.

Do I have to participate in the study?

Participation in the study is entirely voluntary and you do not have to fill in the questionnaire if you would prefer not to do so.

Interested?

Simply visit the study website:

www.sexualfunction.curtin.edu.au

This study has been approved by the Curtin University Human Research Ethics Committee (Approval No. HR171/2011).

[illegible]

Appendix B: Participant Information

Dear participant,

Before completing the Questionnaire, please read this information carefully.

Title: Sexual function of women who have given birth 0-12 months ago: Effect of number of childbirths, symptoms of depression and relationship satisfaction

Investigators: Sexology Department, School of Public Health, Curtin University

General Purpose, Methods and Demands:

Pregnancy and childbirth can affect sexual function of women, their mental health status, and their interpersonal relationships. Previous studies have shown links among sexual function, symptoms of depression and relationship satisfaction in women after childbirth.

A doctoral student at Curtin University has planned a special research in order to study the effects of symptoms of depression, number of childbirths and quality of relationship on sexual function of women during the first year after delivery of a baby. This research also aims to evaluate other potential factors that may affect sexual function of women after childbirth.

I invite you to participate in this study because you have given birth 0-12 months ago. If you have any friends, family members, or relatives, who have given birth during the last 12 months, please let them know about the study and send them the website link.

The Questionnaire will take about 30 minutes to complete.

Conditions of entry:

In order to be eligible to fill in the questionnaire, you need to meet all of the following conditions:

- a) You must be between 16 and 40 years old;
- b) You must have given birth at 37th week or later of pregnancy;

- c) You must have given birth 0-12 months ago;
- d) You must currently have a sexual partner;
- e) You must not use any kind of antipsychotic medicines;
- d) You must not be currently pregnant;

Risks, Discomforts and Benefits:

The Questionnaire asks personal questions about your medical history, obstetrical history, sexual life, sexual function, relationship satisfaction and symptoms of depression. If you feel uncomfortable when answering a question, you do not have to answer the question. If you do not want to complete the questionnaire, you do not have to. If any of the questions asked raise concern and you would like help and support, please contact one of the following:

Lifeline (13 11 14); Kinway relationship counseling (1800 812 511); Relationships Australia (1300 364 277); Suicide Call Back Service (1300 659 467); Beyondblue info line (1300 22 4636); PANDA (1300 726 306); Community Child Health Nurse.

No compensation will be directly provided for completing the questionnaire. However, your experience can contribute much to the understanding and knowledge of sexual function after childbirth. It is hoped that this knowledgebase will inform methods for preventing sexual problems in women after childbirth. In addition, the information you provide may contribute to the development of new health care plans aimed at improving general health and quality of life of mothers and their families.

Confidentiality:

Your name and identifying information will not be asked. Your responses will remain anonymous. No particular individual will be identified from the recorded data. The information you give in the Questionnaire is confidential and will be kept confidential and private. In addition, appropriate security and privacy will be provided over the database where the information is stored. The information will not be shared with any person outside of the research team at Curtin University.

Further Information:

This study has been approved by the Curtin University Human Research Ethics Committee (Approval No. HR171/2011). The Committee is comprised of members of the public, academics, lawyers, doctors and pastoral careers. Its main role is to protect participants. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or by emailing hrec@curtin.edu.au.

Results of the study:

If you would like, you can see a summary of the findings of the study after February 2013 by connecting to the study website (www.sexualfunction.curtin.edu.au) and observe the “Results”.

Consent to Participate:

We ask that you participate only if you understand the aim of the research, and also the risks, discomforts and benefits of the study. If you decide to participate in this study after considering this information, please understand your participation is voluntary. It means that you can choose whether or not you want to be in this study. Completing and submitting the online Questionnaire will mean that you consent to participate. You have the right to discontinue at any time without discrimination, judgment or penalty. You do not have to give any reason to anyone for refusing to complete the questionnaire.

Hereby, you confirm that:

You understand the purpose of this study as explained above and you consent to participate in the study by completing the online Questionnaire.

You are volunteering to complete the Questionnaire.

You understand that your responses will not be identified.

You further understand that there is no penalty or prejudice of any kind for not participating in the study and that you can withdraw at any time.

If you would like support, there is a list of agencies for you here and at the end of the Questionnaire.

Women's Health Centres*

Fremantle Women's Health Centre	114 South Street, (Corner Edmund Street) Fremantle WA 6160 (08) 9431 0500
Goldfield's Women's Health Care Centre Inc	15 Dugan Street, Kalgoorlie PO Box 370, Kalgoorlie WA 6430. (08) 9021 8266
Gosnell's Women's Health Service	Suite 7 Level 1, Gosnell's Community Lotteries House, 2232C Albany Highway, Gosnells WA 6110. (08) 9490 2258
Hedland Well Women's Centre	3A Leake Street, South Hedland PO Box 2072, South Hedland WA 6722. (08) 9140 1124
ISHAR Multicultural Centre for Women's Health	8 Sudbury Place, Mirrabooka WA 6061. (08) 9345 5335
Midland Women's Health Care Place	4 The Avenue, Midland WA 6056. (08) 9250 2221
Nintirri Neighbourhood Centre	PO Box 76, Tom Price WA 6751. (08) 9188 1224
South Coastal Women's Health Services	LifeLinks Community Centre, 4 Civic Boulevard, Rockingham PO Box 709, Rockingham WA 6168. (08) 9550 0900
South West Women's Health and Information Centre Inc	19 Fielder Street, Bunbury PO Box 6049, Bunbury WA 6230. (08) 9791 3350
Women's Health Service Incorporating Women's Health	100 Aberdeen Street, Northbridge WA 6003. (08) 99227 8122

Care House & Perth Women's Centre	
Women's Health Resource Centre Inc. Geraldton	28 Sandford Street, Geraldton PO Box 2100, Geraldton 6531. (08) 9964 2742
Women's Health works	Suite 6, Joondalup Lotteries House, 70 Davidson Tce, Joondalup WA 6027. (08) 9300 1566
Community Child Health Nurse	Please contact your nearest centre to talk to a nurse.

*King Edward Memorial Hospital. (2012). *Women's Health Centres*. WA Department of Health: Retrieved from http://wnhs.health.wa.gov.au/services/women's_health_centres/index.htm. Accessed 26.03.2012.

Thank you very much for your involvement in this research. Your participation is greatly appreciated and will likely help improve the sexual health of Australian women after childbirth.

Sincerely,

Doctoral Student in Sexology, Curtin University

Appendix C: Multi-section questionnaire

Demographics

1. How old are you?

.....

2. What is your ethnicity? You consider yourself to be: (based on the Australian Standard Classification of Cultural and Ethnic Groups (ASCCEG), 2011.

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1249.02011?OpenDocument>)

- ☐ Australian
- ☐ Australian Aboriginal
- ☐ Australian South Sea Islander
- ☐ Torres Strait islander
- ☐ New Zealander
- ☐ Melanesian and Papuan
- ☐ Micronesian
- ☐ Polynesian
- ☐ British
- ☐ Irish
- ☐ Western European
- ☐ Northern European
- ☐ Southern European
- ☐ South Eastern European
- ☐ Eastern European
- ☐ Arab
- ☐ Jewish
- ☐ Peoples of the Sudan
- ☐ Other North African and Middle Eastern
- ☐ Mainland South-East Asian
- ☐ Maritime South-East Asian
- ☐ Chinese Asian

- ☐ Other North-East Asian
- ☐ Southern Asian
- ☐ Central Asian
- ☐ North American
- ☐ South American
- ☐ Central American
- ☐ Caribbean Islander
- ☐ Central and West African
- ☐ Southern and East African
- ☐ Not sure
- ☐ Other (Please specify).....

3. Where do you currently live?

- ☐ Australian Capital Territory
- ☐ New South Wales (in Australia)
- ☐ Victoria (in Australia)
- ☐ Queensland (in Australia)
- ☐ Western Australia
- ☐ South Australia
- ☐ Northern Territory (in Australia)
- ☐ Tasmania
- ☐ Other country (please specify).....

4. What is your highest level of education?

- ☐ Primary school ☐ High school ☐ Diploma
- ☐ Bachelors' degree ☐ Master's degree ☐ Doctor of philosophy
- ☐ Other (please specify).....

5. Which one shows your professional situation at the moment?

- ☐ Student ☐ No formal occupation ☐ Casual work
- ☐ Part-time work ☐ Full-time work

6. How much is your family's annual income?

- ☐ Less than \$50000 ☐ \$50000-100000 ☐ \$101000-1500000
☐ \$151000-200000 ☐ \$201000-300000 ☐ \$301000-400000
☐ \$401000-500000 ☐ More than \$500000 ☐ No answer

Obstetrics and Gynaecologic history

7. If you experience menstrual periods (periodic bleeding), are they regular (an interval between menses of 21-35 days)?

- ☐ No ☐ Yes ☐ I do not have menstrual bleeding

8. Are you currently pregnant?

- ☐ No ☐ Yes

9. How do you prevent pregnancy?

- ☐ I have no male sexual partner ☐ I do not have any vaginal intercourse (sex)
☐ I do not prevent pregnancy ☐ Withdrawal
☐ Oral contraceptive pills ☐ IUD (Intra Uterine Device)
☐ Male condom ☐ Male vasectomy
☐ Injection ☐ Implant
☐ Vaginal pessary ☐ Rhythm method
☐ Other (please specify):

.....

10. Which of the following hormonal medicines do you currently use?

- ☐ I do not use any hormonal medicines ☐ Oral contraceptive pills
☐ Injection contraception ☐ Oestrogen
☐ Progesterone ☐ Dehydroepiandrosterone
☐ Testosterone ☐ Other (please specify):

.....

11. How many times have you ever been pregnant?

.....

12. Have you ever had termination of pregnancy or miscarriage? (Note: termination/miscarriage is the loss of the baby before 20th week of pregnancy).

☐ No ☐ Yes (please specify the number/ Yes (please specify the number/s).....

13. How many children do you currently have?

.....

14. Indicate the method of your last delivery:

- ☐ Normal vaginal delivery without tears/episiotomy
- ☐ Normal vaginal delivery with tears/episiotomy
- ☐ Instrumental delivery [with ventouse (vacuum) or forceps]
- ☐ Caesarean section

15. In your last childbirth, did you give birth at your:

- ☐ 37th week or later of pregnancy
- ☐ 36th week or earlier of pregnancy

16. In your last pregnancy, did you give birth:

- ☐ At home
- ☐ In a private hospital
- ☐ In a public hospital
- ☐ Other (please specify):.....

Baby's characteristic

17. In your last childbirth, you gave birth to:

- ☐ A single baby
- ☐ Twin babies
- ☐ More than 2 babies

18. Your last child is a:

- ☐ Boy
- ☐ Girl

19. How old is your last baby?

20. How much was the birth weight of your last child?

- ☐ Less than 1000 grams
- ☐ 1000 - 1500 grams
- ☐ 1501- 2500 grams
- ☐ 2501 - 4000 grams
- ☐ More than 4000 grams

21. Does your last child suffer any particular illness?

- ☐ No
- ☐ Yes (please specify).....

22. Do you currently breastfeed your child?

- ☐ No
- ☐ Yes, exclusive breastfeeding (only breast milk)
- ☐ Yes, partial breastfeeding (breast milk in addition to formula or baby food)

Medical History

23. Have you been diagnosed with postnatal depression after your last childbirth?

- ☐ No
- ☐ Yes

24. Do you currently use any kinds of antidepressants or antipsychotics?

- ☐ No
- ☐ Yes (please specify)

.....

25. Do you use any particular medicines?

- ☐ No
- ☐ Yes (please specify):

.....

26. Do you smoke cigarettes?

- ☐ No
- ☐ Yes, less than 4 days per week (occasionally)
- ☐ Yes, almost every day (regularly)

27. How much alcohol do you drink per week? (Note: A standard drink is any drink containing 10 grams of alcohol)

- ☐ No drinking
- ☐ Occasional drinking (up to one standard drink per week)
- ☐ Light drinking (2-6 standard drinks per week)
- ☐ Moderate drinking (7-10 standard drinks per week)
- ☐ Heavy drinking (11 or more standard drinks per week)

28. Have you been formally diagnosed with a mental health condition?

- ☐ No
- ☐ Yes (please specify):

.....

29. Have you undergone any of the following operations?

- ☐ Female tubal ligation (female sterilisation)
- ☐ Hysterectomy (removal of the womb)
- ☐ Ovariectomy (removal of the ovary/ies)
- ☐ Mastectomy (removal of the breast/s)
- ☐ None
- ☐ Other (please specify)

.....

30. Did you suffer any illnesses during pregnancy?

- ☐ No
- ☐ Yes (please specify)

.....

31. How many hours of sleep do you normally have in a 24 hour period?

.....hour/s

Sexual life

32. Are you currently in a relationship?

- ☐ Yes
- ☐ No

33. Are you in a same-sex relationship?

- ☐ Yes ☐ No

34. Which one shows your usual sexual activity? (select as many as apply)

- ☐ I have no sexual activity ☐ Masturbation (sexual self-stimulation)
☐ Oral sex ☐ Vaginal sex
☐ Anal sex ☐ Other (please specify):
.....

35. During the past four weeks, how frequent has your sexual activity been?

- ☐ I have no sexual activity ☐ Daily ☐ Every second day
☐ Once a week ☐ Once a fortnight ☐ Once a month

36. When did you resume (restart) sexual activity after your last childbirth?
.....

37. In a sexual activity:

- ☐ I usually initiate sexual intercourse
☐ My partner usually initiate sexual intercourse
☐ We initiate sexual intercourse equally
☐ I have no partner in my sexual activity
☐ I have no sexual activity

Female Sexual Function Index (FSFI)

INSTRUCTIONS: These questions ask about your sexual feelings and responses during the past 4 weeks. Please answer the following questions as honestly and clearly as possible. Your responses will be kept completely confidential. In answering these questions the following definitions apply:

Sexual intercourse is defined as penile penetration (entry) of the vagina.

Sexual stimulation includes situations like foreplay with a partner, self-stimulation (masturbation), or sexual fantasy.

Sexual desire or interest is a feeling that includes wanting to have a sexual experience, feeling receptive to a partner's sexual initiation, and thinking or fantasizing about having sex.

Sexual arousal is a feeling that includes both physical and mental aspects of sexual excitement. It may include feelings of warmth or tingling in the genitals, lubrication (wetness), or muscle contractions.

CHECK ONLY ONE BOX PER QUESTION.

1. Over the past 4 weeks, how often did you feel sexual desire or interest?
 - ☐ Almost always or always
 - ☐ Most times (more than half the time)
 - ☐ Sometimes (about half the time)
 - ☐ A few times (less than half the time)
 - ☐ Almost never or never

2. Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?
 - ☐ Very High
 - ☐ High
 - ☐ Moderate
 - ☐ Low
 - ☐ Very low or none at all

3. Over the past 4 weeks, how often did you feel sexually aroused (“turned on”) during sexual activity or intercourse?
- ☐ No sexual activity
 - ☐ Almost always or always
 - ☐ Most times (more than half the time)
 - ☐ Sometimes (about half the time)
 - ☐ A few times (less than half the time)
 - ☐ Almost never or never
4. Over the past 4 weeks, how would you rate your level of sexual arousal (“turn on”) during sexual activity or intercourse?
- ☐ No sexual activity
 - ☐ Very High
 - ☐ Moderate
 - ☐ Low
 - ☐ Very low or none at all
5. Over the past 4 weeks, how confident were you about becoming sexually aroused during sexual activity or intercourse?
- ☐ No sexual activity
 - ☐ Very high confidence
 - ☐ High confidence
 - ☐ Moderate confidence
 - ☐ Low confidence
 - ☐ Very low or no confidence
6. Over the past 4 weeks, how often have you been satisfied with your arousal (excitement) during sexual activity or intercourse?
- ☐ No sexual activity
 - ☐ Almost always or always
 - ☐ Most times (more than half the time)
 - ☐ Sometimes (about half the time)
 - ☐ A few times (less than half the time)

☐ Almost never or never

7. Over the past 4 weeks, how often did you become lubricated (“wet”) during sexual activity or intercourse?

- ☐ No sexual activity
- ☐ Almost always or always
- ☐ Most times (more than half the time)
- ☐ Sometimes (about half the time)
- ☐ A few times (less than half the time)
- ☐ Almost never or never

8. Over the past 4 weeks, how difficult was it to become lubricated (“wet”) during sexual activity or intercourse?

- ☐ No sexual activity
- ☐ Extremely difficult or impossible
- ☐ Very difficult
- ☐ Difficult
- ☐ Slightly difficult
- ☐ Not difficult

9. Over the past 4 weeks, how often did you maintain your lubrication (“wetness”) until completion of sexual activity or intercourse?

- ☐ No sexual activity
- ☐ Almost always or always
- ☐ Most times (more than half the time)
- ☐ Sometimes (about half the time)
- ☐ A few times (less than half the time)
- ☐ Almost never or never

10. Over the past 4 weeks, how difficult was it to maintain your lubrication (“wetness”) until completion of sexual activity or intercourse?

- ☐ No sexual activity
- ☐ Extremely difficult or impossible

- ☐ Very difficult
- ☐ Difficult
- ☐ Slightly difficult
- ☐ Not difficult

11. Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you reach orgasm (climax)?

- ☐ No sexual activity
- ☐ Almost always or always
- ☐ Most times (more than half the time)
- ☐ Sometimes (about half the time)
- ☐ A few times (less than half the time)
- ☐ Almost never or never

12. Over the past 4 weeks, when you had sexual stimulation or intercourse, how difficult was it for you to reach orgasm (climax)?

- ☐ No sexual activity
- ☐ Extremely difficult or impossible
- ☐ Very difficult
- ☐ Difficult
- ☐ Slightly difficult
- ☐ Not difficult

13. Over the past 4 weeks, how satisfied were you with your ability to reach orgasm (climax) during sexual activity or intercourse?

- ☐ No sexual activity
- ☐ Very satisfied
- ☐ Moderately satisfied
- ☐ About equally satisfied and dissatisfied
- ☐ Moderately dissatisfied
- ☐ Very dissatisfied

14. Over the past 4 weeks, how satisfied have you been with the amount of emotional closeness during sexual activity between you and your partner?

- ☐ No sexual activity
- ☐ Very satisfied
- ☐ Moderately satisfied
- ☐ About equally satisfied and dissatisfied
- ☐ Moderately dissatisfied
- ☐ Very dissatisfied

15. Over the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?

- ☐ Very satisfied
- ☐ Moderately satisfied
- ☐ About equally satisfied and dissatisfied
- ☐ Moderately dissatisfied
- ☐ Very dissatisfied

16. Over the past 4 weeks, how satisfied have you been with your overall sexual life?

- ☐ Very satisfied
- ☐ Moderately satisfied
- ☐ About equally satisfied and dissatisfied
- ☐ Moderately dissatisfied
- ☐ Very dissatisfied

17. Over the past 4 weeks, how often did you experience discomfort or pain during vaginal penetration?

- ☐ Did not attempt intercourse
- ☐ Almost always or always
- ☐ Most times (more than half the time)
- ☐ Sometimes (about half the time)
- ☐ A few times (less than half the time)
- ☐ Almost never or never

18. Over the past 4 weeks, how often did you experience discomfort or pain following vaginal penetration?

- ☐ Did not attempt intercourse
- ☐ Almost always or always
- ☐ Most times (more than half the time)
- ☐ Sometimes (about half the time)
- ☐ A few times (less than half the time)
- ☐ Almost never or never

19. Over the past 4 weeks, how would you rate your level (degree) of discomfort or pain during or following vaginal penetration?

- ☐ Did not attempt intercourse
- ☐ Very high
- ☐ High
- ☐ Moderate
- ☐ Low
- ☐ Very low or none at all

Patient Health Questionnaire (PHQ-8)

Over the last 2 weeks, how often have you been bothered by any of the following:

1. Little interest or pleasure in doing things?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

2. Feeling down, depressed, or hopeless?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

3. Trouble falling or staying asleep, or sleeping too much?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

4. Feeling tired or having little energy?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

5. Poor appetite or overeating?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

7. Trouble concentrating on things, such as reading the newspaper or watching television?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

8. Moving or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual?

☐ Not at all ☐ Several days ☐ More than half the days ☐ Nearly every day

Relationship Assessment Scale (RAS)

Please mark on the answer sheet the number for each item which best answers that item for you.

1. How well does your partner meet your needs?

☐ Poorly ☐ Almost poorly ☐ Average ☐ Well ☐ Extremely well

2. In general, how satisfied are you with your relationship?

☐ Unsatisfied ☐ Almost unsatisfied ☐ Average ☐ Satisfied ☐ Extremely satisfied

3. How good is your relationship compared to most?

☐ Poor ☐ Almost poor ☐ Average ☐ Good ☐ Excellent

4. How often do you wish you hadn't gotten in this relationship?

☐ Very often ☐ Often ☐ Average ☐ Sometimes ☐ Never

5. To what extent has your relationship met your original expectations:

☐ Hardly at all ☐ Almost ☐ Average ☐ Much ☐ Completely

6. How much do you love your partner?

☐ Very little ☐ Little ☐ Average ☐ Much ☐ Very much

7. How many problems are there in your relationship?

☐ Very many ☐ Many ☐ Average ☐ Few ☐ Very few

Qualitative questions

1. What makes you most happy (satisfied) in your sexual relationship with your partner?

2. What makes you most unhappy (unsatisfied) in your sexual relationship with your partner?

3. Do you think your last pregnancy affected your sexual function?

☐No

☐Yes

If yes, in what way?

4. Do you think your last childbirth or delivery affected your sexual function?

☐No

☐Yes

If yes, in what way?

5. Do you think that your last pregnancy affected your mental health?

☐No

☐Yes

If yes, in what way?

6. Do you think that your last childbirth or delivery affected your mental health?

☐No

☐Yes

If yes, in what way?

7. Do you have any other comments? (Please do not write your name or your contact address/number)

Thank you for completing this Questionnaire! The information you have given will be very useful for future work related to sexual function and mental health of women who have given birth.

Appendix D: Publications

Published papers forming parts of the thesis

1. Khajehei, M. (2012). Sexuality after childbirth: Gaps and needs. *World Journal of Obstetrics and Gynecology*, 1(2), 14-16. (Attached)
2. Khajehei, M., Doherty, M., & Tilley, PJM. (2012). Assessment of postnatal depression among Australian lesbian mothers during the first year after childbirth: A pilot study. *International Journal of Childbirth Education*, 27(4), 49-51. (Attached)
3. Khajehei, M., Doherty, M., & Tilley, PJM. (2012). *Women in the same-sex relationship: a multidimensional perspective*. Paper presented at the 12th Asia-Oceania Congress of Sexology (AOCS), Matsue, Japan.
4. Khajehei, M., Doherty, M., & Tilley, PJM. (2012). *Postnatal depression and postpartum sexual dysfunction: an association*. Paper presented at the 12th Asia-Oceania Congress of Sexology (AOCS), Matsue, Japan.

Accepted and published papers not of the candidacy, not forming parts of the thesis or any other degrees

1. Khajehei, M., & Doherty, M. (2013). Sildenafil and female sexual dysfunction: Isn't it time to target the right candidates? *Public Health Frontier*, 2013; 2(1): 3-25. (Attached)
2. Khajehei, M., & Doherty, M. (2012). Childbirth in pleasure and ecstasy: a fountain of hormones and chemicals. *International Journal of Childbirth Education*, 27(3), 71-78. (Attached)
3. Akbar Zadeh, M., Khajehei, M., Sharif, F., & Hadzic, M. (2012). High-risk pregnancy: effects on postpartum depression and anxiety, and health of newborns. *British Journal of Midwifery*, 20(2), 105-113. (Attached)
4. Khajehei, M., Ziyadlou, S., Safari Rad, M., Tabatabaee, HR., & Kashefi, F. (2009). A comparison of sexual outcomes in primiparous women experiencing vaginal and caesarean births. *Indian Journal of Community Medicine*, 34(2), 135-140. (Attached)

5. Khajehei, M. (2012). *Reflection of a sexology PhD student*. Paper presented at the 12th Asia-Oceania Congress of Sexology (AOCS), Matsue, Japan.
6. Khajehei, M., & Hadzic, M. (2010). *Evaluating Relationship between Sexuality and Mental Health with the help of Data Mining Algorithms and Online Questionnaires*. Paper presented at 23rd IEEE International Symposium on Computer-Based Medical, IEEE, Perth, Western Australia.